



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at ***wvOASIS.gov***. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at ***WVPurchasing.gov*** with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header

List View

General Information

Procurement Folder: 129458

SO Doc Code: CRFQ

Procurement Type: Central Master Agreement

SO Dept: 0803

Vendor ID: 000000175314

SO Doc ID: DOT1600000035

Legal Name: CRYOTECH DEICING TECHNOLOGY

Published Date: 10/1/15

Alias/DBA:

Close Date: 10/6/15

Total Bid: \$195,688.00

Close Time: 13:30

Response Date: 10/06/2015

Status: Closed

Response Time: 10:09

Solicitation Description: Addendum 1 CALCIUM MAGNESIUM ACETATE AND A PRE-WETTING

Total of Header Attachments: 0

Total of All Attachments: 0



Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Solicitation Response

Proc Folder : 129458

Solicitation Description : Addendum 1CALCIUM MAGNESIUM ACETATE AND A PRE-WETTING AGENT

Proc Type : Central Master Agreement

Date issued	Solicitation Closes	Solicitation No	Version
	2015-10-06 13:30:00	SR 0803 ESR10061500000001480	1

VENDOR

000000175314

CRYOTECH DEICING TECHNOLOGY

FOR INFORMATION CONTACT THE BUYER

Misty Delong
(304) 558-8802
misty.m.delong@wv.gov

Signature X

FEIN #

DATE

All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	CALCIUM MAGNESIUM ACETATE	100.00000	TON	\$1,896.000000	\$189,600.00

Comm Code	Manufacturer	Specification	Model #
47131823			

Extended Description :	CALDIUM MAGNESIUM ACETATE FOR USE IN THE DEICING OF THE NEW RIVER GORGE BRIDGE
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Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
2	LOW CORROSIVE PRE-WETTING AGENT NO CHLORIDES	800.00000	GL	\$7.610000	\$6,088.00

Comm Code	Manufacturer	Specification	Model #
47131823			

Extended Description :	LOW CORROSIVE PRE-WETTING AGENT NO CHLORIDE FOR USE IN THE DEICING OF THE NEW RIVER GORGE BRIDGE
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October 6, 2015

Ms. Misty Delong
West Virginia Purchasing Division
2019 Washington St. East
Charleston, West Virginia 25305

RE: RFQ 0803 DOT 160000035; Calcium Magnesium Acetate and a Pre-Wetting Agent

Dear Ms. Delong,

Cryotech Deicing Technology is pleased to respond herein to the subject Request for Quotation (RFQ) for Calcium Magnesium Acetate and a Pre-Wetting Agent. The products bid shall be Cryotech CMA[®] solid commercial deicer and Cryotech CF7[®] liquid commercial deicer.

CMA is 96% calcium magnesium acetate and CF7 is 50% potassium acetate with less than 1% corrosion inhibitors (active material). Both products are produced at Cryotech's Fort Madison, Iowa, production facility.

Certification documentation follows with additional information available on the Cryotech website at www.cryotech.com.

Please see the enclosed documents in response to your requirements. Also enclosed, please find *Exceptions Page* for a list of exceptions taken to the RFQ.

Thank you for this opportunity to work with the West Virginia Division of Highways.

Respectfully submitted,

Jane Holterhaus
Contract Process Manager

NOTICE PROPRIETARY INFORMATION: THIS DOCUMENT IS THE PROPERTY OF GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION DBA CRYOTECH DEICING TECHNOLOGY. THE INFORMATION CONTAINED HEREIN IS SUBMITTED IN CONFIDENCE. IT CONTAINS TRADE SECRETS OR CONFIDENTIAL COMMERCIAL OR FINANCIAL INFORMATION EXEMPT FROM DISCLOSURE BY 5 U.S.C. SECTION 552(B)(3) AND (4) (FREEDOM OF INFORMATION ACT), AND 18 U.S.C. SECTION 1905 (TRADE SECRETS ACT). EXCEPT WITH THE WRITTEN CONSENT OF GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION DBA CRYOTECH DEICING TECHNOLOGY (1) THIS DOCUMENT MAY NOT BE COPIED IN WHOLE OR IN PART AND WILL BE RETURNED UPON REQUEST OR WHEN NO LONGER NEEDED BY RECIPIENT AND (2) INFORMATION CONTAINED HEREIN MAY NOT BE COMMUNICATED TO OTHERS AND MAY BE USED BY RECIPIENT ONLY FOR THE PURPOSE FOR WHICH IT WAS TRANSMITTED



October 6, 2015

CRYOTECH DEICING TECHNOLOGY

RE: RFQ 0803 DOT 160000035; Calcium Magnesium Acetate and a Pre-Wetting Agent

General (Cryotech Deicing Technology)

- Cryotech's core business is deicers. All personnel are dedicated to meeting customer needs.
- Cryotech is ISO 9001:2008 and ISO14001:2004 certified. This assures its customers that Cryotech deicers always meet a rigorous, internationally recognized quality standard and is committed to protecting the environment.
- Cryotech's web site (www.cryotech.com) provides easy access to all company, product, safety and ISO information.
- Cryotech's welcomes customer site visits and audits.
- Cryotech provides customers with complimentary on-site product training and instructional materials.
- Cryotech's normal business hours are Monday through Friday 7:30 AM to 4:00 PM CST.
- Cryotech after hours and holiday coverage during peak season (November through March) is handled by Cryotech personnel on an on-call basis to ensure customer needs are met.
- All Cryotech carriers are required to ensure that drivers have completed appropriate safety-training programs, including spill handling. This is part of Cryotech's ISO 9001:2008 quality certification and vendor monitoring program.

Calcium Magnesium Acetate (Cryotech CMA®)

- Cryotech has CMA storage capacity at its Iowa plant for 2,500 metric tons and will deliver directly to West Virginia's Oak Hill storage site within 5-7 days after receipt of order (ARO).
- Orders are shipped in 20 metric ton quantities – due to the weight of the product, this is typically the maximum carriers can ship.

Distribution Plan for Potassium Acetate (Cryotech CF7®)

- Cryotech has CF7 production in Fort Madison, IA and could deliver directly to West Virginia's Oak Hill storage site within 5-7 days ARO.
- Orders shall be shipped in bulk quantities ranging from 4,200 to 4,400 gallons per truck delivery. Due to the weight of the product, this is typically the maximum carriers can ship.



Exceptions Page

RE: Request for Quotation; Calcium Magnesium Acetate and a Pre-Wetting Agent

General Terms and Conditions

Item 38, Additional Agency and Local Government Use: Cryotech prefers not to extend the prices and terms of this proposal to other public agencies.

The prices offered in this proposal are based on an estimated volume, full truckload orders, and delivery location among many other factors; therefore, without knowing who the end user is Cryotech cannot guarantee the same price and terms.

Specifications

Item 6.5, Return Due to Agency Error: Due to issues with contamination, bulk Cryotech CMA® cannot be returned once delivered and unloaded into customer storage. Cryotech CF7® in totes may be returned if original seals are intact.

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SOLICITATION NUMBER: CRFQ DOT1600000035

Addendum Number: 1

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

- ☐ Modify bid opening date and time
- ☐ Modify specifications of product or service being sought
- ☒ Attachment of vendor questions and responses
- ☐ Attachment of pre-bid sign-in sheet
- ☐ Correction of error
- ☐ Other

Description of Modification to Solicitation:

1. Attach vendor questions and responses.

No other changes made.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

ATTACHMENT A

CRFQ DOT1600000035 Addendum #1

Calcium Magnesium Acetate and Pre-Wetting Agent

To answer vendor posed questions:

Question #1: Payment Terms: We will accept the State of West Virginia's Purchasing Card for payment of all orders. What are the West Virginia payment terms? Will the Purchasing Card be presented at the time of order for payment at time of shipment, or will invoices be paid Net 30 with the Purchasing Card?

Response #1: Invoices will be paid Net 30 with the Purchasing Card.

Question #2: Specifications; Section 6.1 Delivery Time: Can the State of West Virginia confirm the delivery requirement after receipt of order?

Response #2: According to Section 6.1 of the Contract Specifications, standard orders shall be delivered according to the established acceptable delivery date agreed upon by the WVDOH and vendor.

The established acceptable delivery date will be determined according to current weather conditions/restrictions; however, typical delivery requirements are 5-7 days.

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: DOT1600000035

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

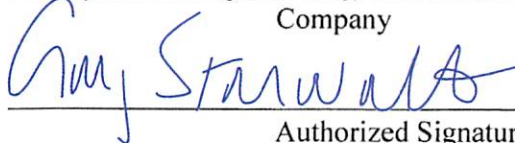
(Check the box next to each addendum received)

<input checked="" type="checkbox"/> Addendum No. 1	<input type="checkbox"/> Addendum No. 6
<input type="checkbox"/> Addendum No. 2	<input type="checkbox"/> Addendum No. 7
<input type="checkbox"/> Addendum No. 3	<input type="checkbox"/> Addendum No. 8
<input type="checkbox"/> Addendum No. 4	<input type="checkbox"/> Addendum No. 9
<input type="checkbox"/> Addendum No. 5	<input type="checkbox"/> Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION
dba Cryotech Deicing Technology

Company



Authorized Signature Craig E. Starwalt

10/6/2015

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
Revised 6/8/2012



Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Request for Quotation
27 – Miscellaneous

Proc Folder: 129458

Doc Description: Addendum 1CALCIUM MAGNESIUM ACETATE AND A PRE-WETTING AGENT

Proc Type: Central Master Agreement

Date Issued	Solicitation Closes	Solicitation No	Version
2015-10-01	2015-10-06 13:30:00	CRFQ 0803 DOT1600000035	2

BID RECEIVING LOCATION

BID CLERK

DEPARTMENT OF ADMINISTRATION

PURCHASING DIVISION

2019 WASHINGTON ST E

CHARLESTON

WV 25305

US

VENDOR

Vendor Name, Address and Telephone Number: GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION
dba Cryotech Deicing Technology
6103 Orthoway
Fort Madison, IA 52627
800-346-7237

FOR INFORMATION CONTACT THE BUYER

Misty DeLong
(304) 558-8802
misty.m.delong@wv.gov

Signature X

FEIN # 33-0270225

DATE 10/6/2015

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

Addendum 1 - to attach vendor questions and responses. No other changes made.

The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Division of Highways to establish an open-end contract for Calcium Magnesium Acetate and a Low Corrosive Pre-wetting Agent to be used on the New River Gorge Bridge.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV25901 US	DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV 25901 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	CALCIUM MAGNESIUM ACETATE	100.00000	TON	\$1,896.00*	\$189,600.00

*Minimum order of 22 US Ton per delivery.

Comm Code	Manufacturer	Specification	Model #
47131823	Cryotech Deicing Technology	Cryotech CMA ^(R)	1100-10

Extended Description :

CALCIUM MAGNESIUM ACETATE FOR USE IN THE DEICING OF THE NEW RIVER GORGE BRIDGE

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV25901 US	DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV 25901 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	LOW CORROSIVE PRE-WETTING AGENT NO CHLORIDES	800.00000	GL	\$7.61*	\$6,088.00

*Minimum order of 1 - 265 gallon tote per delivery.

Comm Code	Manufacturer	Specification	Model #
47131823	Cryotech Deicing Technology	Cryotech CF7 ^(R)	2100-70

Extended Description :

LOW CORROSIVE PRE-WETTING AGENT NO CHLORIDE FOR USE IN THE DEICING OF THE NEW RIVER GORGE BRIDGE

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Technical Questions Due	2015-09-25

Deliveries will be made within 5-7 days after receipt of order.

DOT1600000035	Document Phase Final	Document Description Addendum 1CALCIUM MAGNESIUM AC ETATE AND A PRE-WETTING AGENT	Page 3 of 3
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions



Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

State of West Virginia
Request for Quotation
27 — Miscellaneous

Proc Folder: 129458

Doc Description: CALCIUM MAGNESIUM ACETATE AND A PRE-WETTING AGENT

Proc Type: Central Master Agreement

Date Issued	Solicitation Closes	Solicitation No	Version
2015-09-17	2015-10-06 13:30:00	CRFQ 0803 DOT1600000035	1

BID RECEIVING LOCATION

BID CLERK

DEPARTMENT OF ADMINISTRATION

PURCHASING DIVISION

2019 WASHINGTON ST E

CHARLESTON

WV 25305

US

VENDOR

Vendor Name, Address and Telephone Number: GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION
dba Cryotech Deicing Technology
6103 Orthoway
Fort Madison, IA 52627
800-346-7237

FOR INFORMATION CONTACT THE BUYER

Misty Delong

(304) 558-8802

misty.m.delong@wv.gov

Signature X See Addendum 1

FEIN #33-0270225

DATE 10/6/2015

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Division of Highways to establish an open-end contract for Calcium Magnesium Acetate and a Low Corrosive Pre-wetting Agent to be used on the New River Gorge Bridge.

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV25901 US	DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV 25901 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	CALCIUM MAGNESIUM ACETATE	100.00000	TON		See Addendum 1

Comm Code	Manufacturer	Specification	Model #
47131823	Cryotech Deicing Technology		

Extended Description :

CALDIUM MAGNESIUM ACETATE FOR USE IN THE DEICING OF THE NEW RIVER GORGE BRIDGE

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV25901 US	DIVISION OF HIGHWAYS DISTRICT NINE FAYETTE COUNTY HEADQUARTERS 3121 MAIN ST OAK HILL WV 25901 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
2	LOW CORROSIVE PRE-WETTING AGENT NO CHLORIDES	800.00000	GL		See Addendum 1

Comm Code	Manufacturer	Specification	Model #
47131823	Cryotech Deicing Technology		

Extended Description :

LOW CORROSIVE PRE-WETTING AGENT NO CHLORIDE FOR USE IN THE DEICING OF THE NEW RIVER GORGE BRIDGE

SCHEDULE OF EVENTS

Line	Event	Event Date
1	Technical Questions Due	2015-09-25

DOT1600000035	Document Phase Final	Document Description CALCIUM MAGNESIUM ACETATE AND A PRE-WETTING AGENT	Page 3 of 3
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ADDITIONAL TERMS AND CONDITIONS

See attached document(s) for additional Terms and Conditions

INSTRUCTIONS TO VENDORS SUBMITTING BIDS

1. **REVIEW DOCUMENTS THOROUGHLY:** The attached documents contain a solicitation for bids. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements that if overlooked could lead to disqualification of a Vendor's bid. All bids must be submitted in accordance with the provisions contained in these instructions and the Solicitation. Failure to do so may result in disqualification of Vendor's bid.
2. **MANDATORY TERMS:** The Solicitation may contain mandatory provisions identified by the use of the words "must," "will," and "shall." Failure to comply with a mandatory term in the Solicitation will result in bid disqualification.
3. **PREBID MEETING:** The item identified below shall apply to this Solicitation.

☒ A pre-bid meeting will not be held prior to bid opening.

☐ A **NON-MANDATORY PRE-BID** meeting will be held at the following place and time:

☐ A **MANDATORY PRE-BID** meeting will be held at the following place and time:

All Vendors submitting a bid must attend the mandatory pre-bid meeting. Failure to attend the mandatory pre-bid meeting shall result in disqualification of the Vendor's bid. No one person attending the pre-bid meeting may represent more than one Vendor.

An attendance sheet provided at the pre-bid meeting shall serve as the official document verifying attendance. The State will not accept any other form of proof or documentation to verify attendance. Any person attending the pre-bid meeting on behalf of a Vendor must list on the attendance sheet his or her name and the name of the Vendor he or she is representing. Additionally, the person attending the pre-bid meeting should include the Vendor's E-Mail address, phone number, and Fax number on the attendance sheet. It is the Vendor's responsibility to locate the attendance sheet and provide the required information. Failure to complete the attendance sheet as required may result in disqualification of Vendor's bid.

All Vendors should arrive prior to the starting time for the pre-bid. Vendors who arrive after the starting time but prior to the end of the pre-bid will be permitted to sign in, but are charged with knowing all matters discussed at the pre-bid.

Questions submitted at least five business days prior to a scheduled pre-bid will be discussed at the pre-bid meeting if possible. Any discussions or answers to questions at the pre-bid meeting are preliminary in nature and are non-binding. Official and binding answers to questions will be published in a written addendum to the Solicitation prior to bid opening.

4. **VENDOR QUESTION DEADLINE:** Vendors may submit questions relating to this Solicitation to the Purchasing Division. Questions must be submitted in writing. All questions must be submitted on or before the date listed below and to the address listed below in order to be considered. A written response will be published in a Solicitation addendum if a response is possible and appropriate. Non-written discussions, conversations, or questions and answers regarding this Solicitation are preliminary in nature and are non-binding. Submitted e-mails should have solicitation number in the subject line.

Question Submission Deadline: September 25, 2015

Submit Questions to: Misty Delong

2019 Washington Street, East

Charleston, WV 25305

Fax: (304) 558-4115 (Vendors should not use this fax number for bid submission)

Email: Misty.M.Delong@wv.gov

5. **VERBAL COMMUNICATION:** Any verbal communication between the Vendor and any State personnel is not binding, including verbal communication at the mandatory pre-bid conference. Only information issued in writing and added to the Solicitation by an official written addendum by the Purchasing Division is binding.
6. **BID SUBMISSION:** All bids must be submitted electronically through wvOASIS or signed and delivered by the Vendor to the Purchasing Division at the address listed below on or before the date and time of the bid opening. Any bid received by the Purchasing Division staff is considered to be in the possession of the Purchasing Division and will not be returned for any reason. The Purchasing Division will not accept bids, modification of bids, or addendum acknowledgment forms via e-mail. Acceptable delivery methods include electronic submission via wvOASIS, hand delivery, delivery by courier, or facsimile. The bid delivery address is:

Department of Administration, Purchasing Division

2019 Washington Street East

Charleston, WV 25305-0130

A bid that is not submitted electronically through wvOASIS should contain the information listed below on the face of the envelope or the bid may be rejected by the Purchasing Division.:

SEALED BID:
BUYER:
SOLICITATION NO.:
BID OPENING DATE:
BID OPENING TIME:
FAX NUMBER:

In the event that Vendor is responding to a request for proposal, and chooses to respond in a manner other than by electronic submission through wvOASIS, the Vendor shall submit one original technical and one original cost proposal plus ^{NA} convenience copies of each to the Purchasing Division at the address shown above. Additionally, if Vendor does not submit its bid through wvOASIS, the Vendor should identify the bid type as either a technical or cost proposal on the face of each bid envelope submitted in response to a request for proposal as follows:

BID TYPE: (This only applies to CRFP)

☐ Technical

☐ Cost

7. **BID OPENING:** Bids submitted in response to this Solicitation will be opened at the location identified below on the date and time listed below. Delivery of a bid after the bid opening date and time will result in bid disqualification. For purposes of this Solicitation, a bid is considered delivered when confirmation of delivery is provided by wvOASIS (in the case of electronic submission) or when the bid is time stamped by the official Purchasing Division time clock (in the case of hand delivery).

Bid Opening Date and Time: October 6, 2015 at 1:30 PM, EST
Bid Opening Location: Department of Administration, Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

8. **ADDENDUM ACKNOWLEDGEMENT:** Changes or revisions to this Solicitation will be made by an official written addendum issued by the Purchasing Division. Vendor should acknowledge receipt of all addenda issued with this Solicitation by completing an Addendum Acknowledgment Form, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

- 9. BID FORMATTING:** Vendor should type or electronically enter the information onto its bid to prevent errors in the evaluation. Failure to type or electronically enter the information may result in bid disqualification.
- 10. ALTERNATES:** Any model, brand, or specification listed in this Solicitation establishes the acceptable level of quality only and is not intended to reflect a preference for, or in any way favor, a particular brand or vendor. Vendors may bid alternates to a listed model or brand provided that the alternate is at least equal to the model or brand and complies with the required specifications. The equality of any alternate being bid shall be determined by the State at its sole discretion. Any Vendor bidding an alternate model or brand should clearly identify the alternate items in its bid and should include manufacturer's specifications, industry literature, and/or any other relevant documentation demonstrating the equality of the alternate items. Failure to provide information for alternate items may be grounds for rejection of a Vendor's bid.
- 11. EXCEPTIONS AND CLARIFICATIONS:** The Solicitation contains the specifications that shall form the basis of a contractual agreement. Vendor shall clearly mark any exceptions, clarifications, or other proposed modifications in its bid. Exceptions to, clarifications of, or modifications of a requirement or term and condition of the Solicitation may result in bid disqualification.
- 12. COMMUNICATION LIMITATIONS:** In accordance with West Virginia Code of State Rules §148-1-6.6, communication with the State of West Virginia or any of its employees regarding this Solicitation during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited without prior Purchasing Division approval. Purchasing Division approval for such communication is implied for all agency delegated and exempt purchases.
- 13. REGISTRATION:** Prior to Contract award, the apparent successful Vendor must be properly registered with the West Virginia Purchasing Division and must have paid the \$125 fee, if applicable.
- 14. UNIT PRICE:** Unit prices shall prevail in cases of a discrepancy in the Vendor's bid.
- 15. PREFERENCE:** Vendor Preference may only be granted upon written request and only in accordance with the West Virginia Code § 5A-3-37 and the West Virginia Code of State Rules. A Vendor Preference Certificate form has been attached hereto to allow Vendor to apply for the preference. Vendor's failure to submit the Vendor Preference Certificate form with its bid will result in denial of Vendor Preference. Vendor Preference does not apply to construction projects. 2.5%
- 16. SMALL, WOMEN-OWNED, OR MINORITY-OWNED BUSINESSES:** For any solicitations publicly advertised for bid, in accordance with West Virginia Code §5A-3-37(a)(7) and W. Va. CSR § 148-22-9, any non-resident vendor certified as a small, women-owned, or minority-owned business under W. Va. CSR § 148-22-9 shall be provided the

same preference made available to any resident vendor. Any non-resident small, women-owned, or minority-owned business must identify itself as such in writing, must submit that writing to the Purchasing Division with its bid, and must be properly certified under W. Va. CSR § 148-22-9 prior to contract award to receive the preferences made available to resident vendors. Preference for a non-resident small, women-owned, or minority owned business shall be applied in accordance with W. Va. CSR § 148-22-9.

17. WAIVER OF MINOR IRREGULARITIES: The Director reserves the right to waive minor irregularities in bids or specifications in accordance with West Virginia Code of State Rules § 148-1-4.6.

18. ELECTRONIC FILE ACCESS RESTRICTIONS: Vendor must ensure that its submission in wvOASIS can be accessed by the Purchasing Division staff immediately upon bid opening. The Purchasing Division will consider any file that cannot be immediately opened and/or viewed at the time of the bid opening (such as, encrypted files, password protected files, or incompatible files) to be blank or incomplete as context requires, and are therefore unacceptable. A vendor will not be permitted to unencrypt files, remove password protections, or resubmit documents after bid opening if those documents are required with the bid.

GENERAL TERMS AND CONDITIONS:

1. **CONTRACTUAL AGREEMENT:** Issuance of a Award Document signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.
2. **DEFINITIONS:** As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.
 - 2.1. **"Agency" or "Agencies"** means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.
 - 2.2. **"Contract"** means the binding agreement that is entered into between the State and the Vendor to provide the goods or services requested in the Solicitation.
 - 2.3. **"Director"** means the Director of the West Virginia Department of Administration, Purchasing Division.
 - 2.4. **"Purchasing Division"** means the West Virginia Department of Administration, Purchasing Division.
 - 2.5. **"Award Document"** means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the contract holder.
 - 2.6. **"Solicitation"** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.
 - 2.7. **"State"** means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.
 - 2.8. **"Vendor" or "Vendors"** means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

3. **CONTRACT TERM; RENEWAL; EXTENSION:** The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

☒ **Term Contract**

Initial Contract Term: This Contract becomes effective on 12/01/2015 and extends for a period of one year(s).

Renewal Term: This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal should be submitted to the Purchasing Division thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Renewal of this Contract is limited to two successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed 24 months in total. Automatic renewal of this Contract is prohibited. Notwithstanding the foregoing, Purchasing Division approval is not required on agency delegated or exempt purchases. Attorney General approval may be required for vendor terms and conditions.

Delivery Order Limitations: In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

- ☐ **Fixed Period Contract:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within _____ days.

- ☐ **Fixed Period Contract with Renewals:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and part of the Contract more fully described in the attached specifications must be completed within _____ days. Upon completion, the vendor agrees that maintenance, monitoring, or warranty services will be provided for one year thereafter with an additional _____ successive one year renewal periods or multiple renewal periods of less than one year provided that the multiple renewal periods do not exceed _____ months in total. Automatic renewal of this Contract is prohibited.

- ☐ **One Time Purchase:** The term of this Contract shall run from the issuance of the Award Document until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

- ☐ **Other:** See attached.

4. **NOTICE TO PROCEED:** Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fully executed Award Document will be considered notice to proceed.
5. **QUANTITIES:** The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.
- ☒ **Open End Contract:** Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.
- ☐ **Service:** The scope of the service to be provided will be more clearly defined in the specifications included herewith.
- ☐ **Combined Service and Goods:** The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.
- ☐ **One Time Purchase:** This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.
6. **PRICING:** The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification.
7. **EMERGENCY PURCHASES:** The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute a breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.
8. **REQUIRED DOCUMENTS:** All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.

☐ **BID BOND:** All Vendors shall furnish a bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.

☐ **PERFORMANCE BOND:** The apparent successful Vendor shall provide a performance bond in the amount of _____. The performance bond must be received by the Purchasing Division prior to Contract award. On construction contracts, the performance bond must be 100% of the Contract value.

☐ **LABOR/MATERIAL PAYMENT BOND:** The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a performance and labor/material payment bond will only be allowed for projects under \$100,000. Personal or business checks are not acceptable.

☐ **MAINTENANCE BOND:** The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.

☒ **INSURANCE:** The apparent successful Vendor shall furnish proof of the following insurance prior to Contract award and shall list the state as a certificate holder:

☒ **Commercial General Liability Insurance:** In the amount of 1,000,000.00 _____ or more.

☐ **Builders Risk Insurance:** In an amount equal to 100% of the amount of the Contract.

☐☐☐☐☐

The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed above.

- ☐ **LICENSE(S) / CERTIFICATIONS / PERMITS:** In addition to anything required under the Section entitled Licensing, of the General Terms and Conditions, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits prior to Contract award, in a form acceptable to the Purchasing Division.

☐☐☐☐

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications prior to Contract award regardless of whether or not that requirement is listed above.

- 9. WORKERS' COMPENSATION INSURANCE:** The apparent successful Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

- 10. LITIGATION BOND:** The Director reserves the right to require any Vendor that files a protest of an award to submit a litigation bond in the amount equal to one percent of the lowest bid submitted or \$5,000, whichever is greater. The entire amount of the bond shall be forfeited if the hearing officer determines that the protest was filed for frivolous or improper purpose, including but not limited to, the purpose of harassing, causing unnecessary delay, or needless expense for the Agency. All litigation bonds shall be made payable to the Purchasing Division. In lieu of a bond, the protester may submit a cashier's check or certified check payable to the Purchasing Division. Cashier's or certified checks will be deposited with and held by the State Treasurer's office. If it is determined that the protest has not been filed for frivolous or improper purpose, the bond or deposit shall be returned in its entirety.

- 11. LIQUIDATED DAMAGES:** Vendor shall pay liquidated damages in the amount of n/a for n/a. This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy.

- 12. ACCEPTANCE/REJECTION:** The State may accept or reject any bid in whole, or in part. Vendor's signature on its bid signifies acceptance of the terms and conditions contained in the Solicitation and Vendor agrees to be bound by the terms of the Contract, as reflected in the Award Document, upon receipt.
- 13. FUNDING:** This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.
- 14. PAYMENT:** Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears.
- 15. TAXES:** The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
- 16. CANCELLATION:** The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Purchasing Division Director may also cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-7.16.2.
- 17. TIME:** Time is of the essence with regard to all matters of time and performance in this Contract.
- 18. APPLICABLE LAW:** This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.
- 19. COMPLIANCE:** Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendor acknowledges that it has reviewed, understands, and will comply with all applicable law.
- 20. PREVAILING WAGE:** On any contract for the construction of a public improvement whose cost at the time the contract is awarded will be paid with public money in an amount greater than \$500,000, Vendor and any subcontractors utilized by Vendor shall pay a rate or rates of wages which shall not be less than the fair minimum rate or rates of wages (prevailing wage), as established under West Virginia Code §§ 21-5A-1 et seq. Vendor shall

be responsible for ensuring compliance with prevailing wage requirements and determining when prevailing wage requirements are applicable.

- 21. ARBITRATION:** Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.
- 22. MODIFICATIONS:** This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary, no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). No Change shall be implemented by the Vendor until such time as the Vendor receives an approved written change order from the Purchasing Division.
- 23. WAIVER:** The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.
- 24. SUBSEQUENT FORMS:** The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.
- 25. ASSIGNMENT:** Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments. Notwithstanding the foregoing, Purchasing Division approval may or may not be required on certain agency delegated or exempt purchases.
- 26. WARRANTY:** The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.
- 27. STATE EMPLOYEES:** State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.
- 28. BANKRUPTCY:** In the event the Vendor files for bankruptcy protection, the State of West Virginia may deem this Contract null and void, and terminate this Contract without notice.

29. CONFIDENTIALITY: The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/default.html>.

30. DISCLOSURE: Vendor's response to the Solicitation and the resulting Contract are considered public documents and will be disclosed to the public in accordance with the laws, rules, and policies governing the West Virginia Purchasing Division. Those laws include, but are not limited to, the Freedom of Information Act found in West Virginia Code §§ 29B-1-1 et seq. and the competitive bidding laws found West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq.

If a Vendor considers any part of its bid to be exempt from public disclosure, Vendor must so indicate by specifically identifying the exempt information, identifying the exemption that applies, providing a detailed justification for the exemption, segregating the exempt information from the general bid information, and submitting the exempt information as part of its bid but in a segregated and clearly identifiable format. Failure to comply with the foregoing requirements will result in public disclosure of the Vendor's bid without further notice. A Vendor's act of marking all or nearly all of its bid as exempt is not sufficient to avoid disclosure and WILL NOT BE HONORED. Vendor's act of marking a bid or any part thereof as "confidential" or "proprietary" is not sufficient to avoid disclosure and WILL NOT BE HONORED. A legend or other statement indicating that all or substantially all of the bid is exempt from disclosure is not sufficient to avoid disclosure and WILL NOT BE HONORED. Additionally, pricing or cost information will not be considered exempt from disclosure and requests to withhold publication of pricing or cost information WILL NOT BE HONORED.

Vendor will be required to defend any claimed exemption for nondisclosure in the event of an administrative or judicial challenge to the State's nondisclosure. Vendor must indemnify the State for any costs incurred related to any exemptions claimed by Vendor. Any questions regarding the applicability of the various public records laws should be addressed to your own legal counsel prior to bid submission.

31. LICENSING: In accordance with West Virginia Code of State Rules §148-1-6.1.7, Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agency or political subdivision. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.

32. ANTITRUST: In submitting a bid to, signing a contract with, or accepting a Award Document from any agency of the State of West Virginia, the Vendor agrees to convey, sell, assign, or transfer to the State of West Virginia all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to Vendor.

33. VENDOR CERTIFICATIONS: By signing its bid or entering into this Contract, Vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this Solicitation in its entirety; understands the requirements, terms and conditions, and other information contained herein. Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency. The individual signing this bid or offer on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or offer or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

34. PURCHASING CARD ACCEPTANCE: The State of West Virginia currently utilizes a Purchasing Card program, administered under contract by a banking institution, to process payment for goods and services. The Vendor must accept the State of West Virginia's Purchasing Card for payment of all orders under this Contract unless the box below is checked.

☐ Vendor is not required to accept the State of West Virginia's Purchasing Card as payment for all goods and services.

35. VENDOR RELATIONSHIP: The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but

not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing. Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

36. INDEMNIFICATION: The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

37. PURCHASING AFFIDAVIT: In accordance with West Virginia Code § 5A-3-10a, all Vendors are required to sign, notarize, and submit the Purchasing Affidavit stating that neither the Vendor nor a related party owe a debt to the State in excess of \$1,000. The affidavit must be submitted prior to award, but should be submitted with the Vendor's bid. A copy of the Purchasing Affidavit is included herewith.

38. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE: This Contract may be utilized by and extends to other agencies, spending units, and political subdivisions of the State of West Virginia; county, municipal, and other local government bodies; and school districts ("Other Government Entities"). This Contract shall be extended to the aforementioned Other Government Entities on the same prices, terms, and conditions as those offered and agreed to in this Contract. If the Vendor does not wish to extend the prices, terms, and conditions of its bid and subsequent contract to the Other Government Entities, the Vendor must clearly indicate such refusal in its bid. A refusal to extend this Contract to the Other Government Entities shall not impact or influence the award of this Contract in any manner.

39. CONFLICT OF INTEREST: Vendor, its officers or members or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

40. REPORTS: Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

- ☒ Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.

- ☒ Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at purchasing.requisitions@wv.gov.

41. BACKGROUND CHECK: In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry.

After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of Protective Services for purposes of verifying compliance with this provision.

The State reserves the right to prohibit a service provider's employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check.

Service providers should contact the West Virginia Division of Protective Services by phone at (304) 558-9911 for more information.

42. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS: Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

- a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.
- b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open heath, basic oxygen, electric furnace, Bessemer or other steel making process. The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:
- c. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars (\$2,500.00), whichever is greater.

For the purposes of this section, the cost is the value of the steel product as delivered to the project; or

- d. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

43. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL: In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars (\$50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a "substantial labor surplus area", as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products.

This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

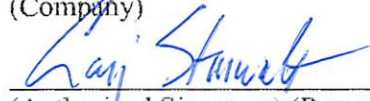
All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

CERTIFICATION AND SIGNATURE PAGE

By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION
dba Cryotech Deicing Technology

(Company)



Craig E. Starwalt President and CEO

(Authorized Signature) (Representative Name, Title)

phone 800-346-7237 fax: 319-372-2662 10/6/2015
(Phone Number) (Fax Number) (Date)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: CRFQ DOT1600000035

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

<input type="checkbox"/> Addendum No. 1	<input type="checkbox"/> Addendum No. 6
<input type="checkbox"/> Addendum No. 2	<input type="checkbox"/> Addendum No. 7
<input type="checkbox"/> Addendum No. 3	<input type="checkbox"/> Addendum No. 8
<input type="checkbox"/> Addendum No. 4	<input type="checkbox"/> Addendum No. 9
<input type="checkbox"/> Addendum No. 5	<input type="checkbox"/> Addendum No. 10

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION
dba Cryotech Deicing Technology
Company

See Addendum 1
Authorized Signature Craig E. Starwalt

10/6/2015
Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.

REQUEST FOR QUOTATION
**Calcium Magnesium Acetate and
Low Corrosive Pre-wetting Agent**

SPECIFICATIONS

- 1. PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Division of Highways to establish an open-end contract for Calcium Magnesium Acetate and a Low Corrosive Pre-wetting Agent to be used on the New River Gorge Bridge.
- 2. DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.
 - 2.1 “Contract Item” or “Contract Items”** means the list of items identified in Section 3.2 below and on the Pricing Pages.
 - 2.2 “Pricing Pages”** means the schedule of prices, estimated order quantity, and totals contained in wvOASIS or attached hereto as Exhibit A, and used to evaluate the Solicitation responses.
 - 2.3 “Solicitation”** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.
 - 2.4 “WVDOH”** used throughout this Solicitation means the West Virginia Division of Highways.
 - 2.8 “Contractor” or “Vendor”** used throughout this Solicitation and in any cited sections of the West Virginia Department of Transportation, Division of Highways Standard Specifications, Roads and Bridges, adopted latest Standard Spec book edition, as modified by all subsequent annual Supplemental Specifications, are interchangeable.
 - 2.9 “Standard Specs”** used throughout this Solicitation means the West Virginia Department of Transportation, Division of Highways Standard Specifications, Roads and Bridges, adopted latest Standard Spec book edition, as modified by all subsequent annual Supplemental Specifications.
- 3. GENERAL REQUIREMENTS:**
 - 3.1** The following sections of the Standard Specs shall apply to the administration of this contract: Sections 101, 102.4, 102.5, 105.1, 105.3, 105.4, 105.10, 105.11, 105.12, 105.13, 106.3, 106.4, 106.5, 106.6, 106.7, 106.9, 107.1, 107.2, 107.3, 107.14, 107.19, 107.20, 108.8, 109.1, 109.2 and 109.20.

REQUEST FOR QUOTATION
**Calcium Magnesium Acetate and
Low Corrosive Pre-wetting Agent**

A complete hard copy of the Standard Specs may be obtained from:

West Virginia Division of Highways
Contract Administration
Building 5, Room 722
1900 Kanawha Boulevard, East
Charleston, West Virginia 25305
(Phone) 304-558-2885

A complete electronic copy of the Standard Specs may be obtained by sourcing:
<http://www.transportation.wv.gov/highways/Contractadmin/specifications/2010StandSpec/Pages/default.aspx>

3.2 Minimum Material Requirements:

3.2.1 Calcium Magnesium Acetate (CMA) shall conform to the following product specifications and shall be delivered in bulk.

Composition: A nominal 3/7 CMA of this analysis:

$\text{Ca}_x\text{Mg}_y(\text{C}_2\text{H}_3\text{O}_2)_2(x+y)$

$x = 3 \text{ to } 4$

$y = 7 \text{ to } 6$

CMA 91% Minimum

Water (Free and Hydration) 5% Maximum

Water-Insoluble Material 4% Maximum

Particle Size: Sieve 4 90% minimum

Sieve 14 10% Maximum

Particle Shape: Hard, Angular, Asymmetrical Granules

Specific Gravity: Minimum 1.2

Bulk Density: 40 lb/ft³ to 44 lb/ft³

Residual Base: Maximum 0.4 meg base/gm sample

Product pH: pH 8 to 10 in a 10% solution

3.2.2 Low Corrosive Pre-wetting Agent/No Chlorides

Density: At 68° F. 10.7 lbs/gallon

Viscosity: At 68°F. 10 cp maximum

At 32°F. 20 cp maximum

Freezing Point: -76°F

Typical pH: 11.0+/-0.5

Specific Gravity: At 68°F. 1.25-1.30

Container Size: 265 gallon tote

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Calcium Magnesium Acetate and
Low Corrosive Pre-wetting Agent

The vendor shall provide bid product label/documentation with their bid for each item bid. WVDOH will evaluate each item on equivalency of bid product to determine if the bid product meets the required specifications.

3.3 Sampling and Testing:

Upon award of this contract, the Vendor shall provide the WVDOH with the proposed source of supply. Acceptance shall be based on suppliers' certification of quality and gradation. This information shall be directed to:

West Virginia Division of Highways
Materials Section
190 Dry Branch Road
Charleston, WV 25306

The WVDOH may conduct sampling and testing to verify material quality or gradation.

4. CONTRACT AWARD:

4.1 Contract Award: The Contract is intended to provide Agency with a purchase price on both Contract Items. A Contract will be awarded to the Vendor that provides the lowest Unit Cost, per Ton, for Contract Item #1 and to the Vendor that provides the lowest Unit Cost, per Gallon, for Contract Item #2.

4.2 Pricing Pages: Vendors should complete the Pricing Page by providing delivery unit prices for each Contract Item. Vendors may bid one or both items on the Pricing Page.

Vendors should be cautioned as the quantities listed are estimates only. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery whether more or less than the quantities shown. No future use of the Contract or any individual item is guaranteed or implied.

Vendor should type or electronically enter the information into the Pricing Pages through wvOASIS, if available, or as an electronic document. In most cases, the Vendor can request an electronic copy of the Pricing Page for bid purposes by sending an email request to the following address: misty.m.delong@wv.gov.

REQUEST FOR QUOTATION
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5. ORDERING AND PAYMENT:

- 5.1 Ordering:** Vendor shall accept orders through wvOASIS, regular mail, facsimile, e-mail, or any other written forms of communication. Vendor may, but is not required to, accept on-line orders through a secure internet ordering portal/website. If Vendor has the ability to accept on-line orders, it should include in its response a brief description of how Agencies may utilize the on-line ordering system. Vendor shall ensure that its on-line ordering system is properly secured prior to processing Agency orders on-line.
- 5.2 Payment:** Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia. The State of West Virginia currently utilizes a Purchasing Card program, administered under contract by a banking institution, to process payment for goods and services. The Vendor must accept the State of West Virginia's Purchasing Card for payment of all orders under this Contract.

6. DELIVERY AND RETURN:

- 6.1 Delivery Time:** Vendor shall deliver standard orders according to the established acceptable delivery date agreed at the time of order. Vendor shall deliver emergency orders within an established acceptable time frame, agreed upon by the WVDOH and the vendor, after orders are received. Vendor shall ship all orders in accordance with the established delivery date and shall not hold orders until a minimum delivery quantity is met. If the vendor is unable to furnish material in accordance with the established delivery date, the WVDOH District Engineer/Manager shall be advised in writing within five (5) working days of the reason for failure to conform to the delivery requirements.
- 6.2 Late Delivery:** The Agency placing the order under this Contract must be notified in writing within five (5) days if orders will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the delayed order, and/or obtaining the items ordered from a third party.

Any Agency seeking to obtain items from a third party under this provision must first obtain approval of the Purchasing Division.

- 6.3 Delivery Payment/Risk of Loss:** Standard order delivery shall be F.O.B. destination to the Agency's location. Vendor shall include the cost of standard order delivery charges in its bid pricing/discount and is not permitted to charge the Agency separately for such delivery. The Agency will pay delivery charges on all

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emergency orders provided that Vendor invoices those delivery costs as a separate charge with the original freight bill attached to the invoice.

6.4 Return of Unacceptable Items: If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that items are unacceptable, or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.

6.5 Return Due to Agency Error: Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.

7. VENDOR DEFAULT:

7.1 The following shall be considered a vendor default under this Contract.

7.1.1 Failure to provide Contract Items in accordance with the requirements contained herein.

7.1.2 Failure to comply with other specifications and requirements contained herein.

7.1.3 Failure to comply with any laws, rules and ordinances applicable to the Contract Services provided under this Contract.

7.1.4 Failure to remedy deficient performance upon request.

7.2 The following remedies shall be available to Agency upon default.

7.2.1 Immediate cancellation of the Contract.

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7.2.2 Immediate cancellation of one or more Delivery Orders issued under this Contract.

7.2.3 Any other remedies available in law or equity.

8. MISCELLENIOUS:

8.1 No Substitutions: The Vendor shall supply only Contract Items submitted in response to the Solicitation unless a contract modification is approved in accordance with the provisions contained in this Contract.

8.2 Vendor Supply: The Vendor must carry sufficient inventory of the Contract Items being offered to fulfill its obligations under this Contract. By signing its bid, the Vendor certifies that it can supply the Contract Items contained in its bid response.

8.3 Reports: The Vendor shall provide quarterly reports and annual summaries to the Agency showing the Contract Items purchased, quantities of Contract Items purchased and the total dollar value of the Contract Items purchased. The Vendor shall also provide reports, upon request, showing the Contract Items purchased during the term of this Contract, the quantity purchased for each of those Contract Items and the total value of purchases for each of those Contract Items. Failure to supply such reports may be grounds for cancellation of this Contract.

8.4 Contract Manager: During its performance of this Contract, the Vendor must designate and maintain a primary contract manager responsible for overseeing the Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. The Vendor should list its Contract manager and his or her contact information below.

Contract Manager: Jane Holterhaus
Telephone Number: 800-346-7237
Fax Number: 319-372-2662
Email Address: contracts@cryotech.com

State of West Virginia **VENDOR PREFERENCE CERTIFICATE**

Certification and application is hereby made for Preference in accordance with **West Virginia Code**, §5A-3-37. (Does not apply to construction contracts). **West Virginia Code**, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the **West Virginia Code**. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Vendor Preference, if applicable.

1. Application is made for 2.5% vendor preference for the reason checked:

- ☐ Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or**,
- ☐ Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or**,
- ☐ Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; **or**,

2. Application is made for 2.5% vendor preference for the reason checked:

- ☐ Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or**,

3. Application is made for 2.5% vendor preference for the reason checked:

- ☐ Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or**,

4. Application is made for 5% vendor preference for the reason checked:

- ☐ Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; **or**,

5. Application is made for 3.5% vendor preference who is a veteran for the reason checked:

- ☐ Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; **or**,

6. Application is made for 3.5% vendor preference who is a veteran for the reason checked:

- ☐ Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

7. Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with West Virginia Code §5A-3-59 and West Virginia Code of State Rules.

- ☐ Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: N/A Signed: N/A

Date: N/A Title: N/A

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

MANDATE: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION dba Cryotech Deicing Technology

Authorized Signature: [Signature] Date: 10/6/15

State of Iowa

County of Lee, to-wit:

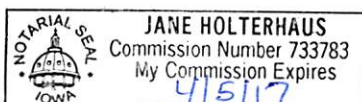
Taken, subscribed, and sworn to before me this 6th day of October, 2015.

My Commission expires 4/5/17, 20 .

AFFIX SEAL HERE

NOTARY PUBLIC [Signature]

Purchasing Affidavit (Revised 08/01/2015)



CRYOTECH

ISO 9001:2008 & 14001:2004

Certified Company



Cryotech Deicing Technology is a division of General Atomics International Services Corporation, a San Diego-based company specializing in energy-related research and product development. In 1992, General Atomics purchased the deicing business of Chevron Chemical Company.

Included in the acquisition was the production facility at Fort Madison, Iowa, plus all patents, processes, and rights developed by Chevron. The business was renamed Cryotech Deicing Technology, the root word "Cryo" meaning cold.

A world leader in acetate technology, Cryotech manufactures and markets environmentally compatible acetate-based highway, commercial, and airport runway deicers. Acetates are considered safe for the environment because they readily biodegrade and exhibit low toxicity to vegetation and aquatic life. Acetates have low corrosion rates, and are ideal for application on reinforced concrete structures such as bridges and parking garages. Acetates also have a residual effect, working longer than common deicers.

In 1998, Cryotech's Fort Madison, Iowa plant received ISO 9002 certification for its quality process systems. ISO is an internationally recognized quality model. It provides assurance to customers that the products they receive are produced and shipped under rigorous international quality standards. In March 2002, Cryotech's Fort Madison, Iowa, plant achieved conversion to ISO 9001:2000 certification. In June 2009, Cryotech achieved conversion to ISO 9001:2008. Cryotech also became ISO 14001:2004 certified in 2005. To achieve ISO 14001:2004 certification, a company must establish and maintain a detailed environmental management system which allows it to identify and take required actions that reduce environmental and health risks, while consistently improving its environmental performance. Cryotech is the first manufacturer in its industry to receive certification to both ISO standards, reaffirming its position as the industry leader in acetate-based deicers.

For over 10 years, Cryotech has also manufactured Type I and Type IV propylene glycol based Aircraft Deicers/Anti-icers with Industry-leading performance and internationally recognized product quality.

TO ORDER OR FOR PRODUCT INFORMATION CONTACT:

Ph: +1 319.372.6012 or +1 800.346.7237 Fax: +1 319.372.2662

E-mail: deicers@cryotech.com

Cryotech Deicing Technology . 6103 Orthoway . Fort Madison, IA . 52627
WWW.CRYOTECH.COM



ISO 9001
FM 39092



ISO 14001
EMS 89384



Working with Cryotech

With over 20 years in the deicer business and a wide range of products, from commercial to aviation and industrial markets, Cryotech is the benchmark by which others are measured.

- **Dedicated Customer Service and Sales Staff**

At Cryotech, a 24-hour customer service is a must because your needs do not always happen between 9 a.m. and 5 p.m. With a professional sales team and dependable customer service staff on duty every day of the year, Cryotech makes sure you have the deicer and information necessary to do your job successfully.

- **Technical Assistance**

Cryotech has been responsible for developing, introducing, and upgrading industry technology, including the introduction of calcium magnesium acetate and sodium acetate to the North American market. Cryotech has taken leadership roles in the industry, serving on the Society of Automotive Engineers G12 working groups, the Airport Cooperative Research Program, and the Innovative Pavement Research Foundation. Cryotech was the first company to introduce a next generation bio-based liquid runway deicer to address emerging industry concerns. This history has made Cryotech the industry leader in product development and customer service.

Cryotech's technical team will answer your questions regarding material and equipment compatibility, product chemistry, product testing, or any other questions that your staff may have.

- **Tank and Storage Solutions**

Cryotech knows your needs go beyond just deicing chemicals, so the staff will provide assistance with tank storage solutions to ensure you have enough inventory when winter weather approaches.

- **On-site Training**

Cryotech wants you to be successful in applying its deicers, so you can quickly and efficiently get through your winter storm events. Complimentary training, videos, and literature are provided to meet your training needs. Please contact [Cryotech](http://www.cryotech.com) for more details.

- **An ISO 9001:2008 and 14001:2004 Certified Company**

ISO standards assure customers that all Cryotech activities - design, manufacturing, production, purchasing, quality control, packaging, handling, storage, shipping, and customer service - are appropriately managed and controlled. This means customers receive products that meet rigorous international quality standards and that Cryotech minimizes its operational impact on the environment.

- **Production Sites and Terminals Across North America**

Cryotech has an industry leading distribution system including terminals, railcars, and production sites across the United States and Canada. This ensures Cryotech customers receive the products they need, when they need them.

You can depend on Cryotech when technology, quality, customer service, and distribution systems matter most.



CRYOTECH DEICING TECHNOLOGY SUSTAINABILITY POLICY

Vision

Cryotech strives to manufacture superior products and provide exceptional service to customers, continually improving the foundation for the future. Sustainability at Cryotech stems from core business values that guide its day-to-day operations as well as long term goals and planning.

Cryotech Business Policy

Rooted in sound, ethical business practices, our mission is to safely produce and deliver products with a commitment to customer satisfaction, industry leadership, and prevention of pollution, injury, and ill-health. We are committed to complying with legal and other requirements, and producing environmentally-preferred products in a sustainable manner. We will continually improve our systems to meet customer expectations, maintain a safe workplace, and monitor the health, safety and environmental impacts associated with our work through implementation of annual objectives and targets.

Principles

- ❖ Maintaining a sound, profitable, and enduring business
 - ❖ Participating in environmentally friendly activities
 - ❖ Ensuring processes, products, and manufacturing practices adequately address current environmental concerns while considering future needs
 - ❖ Meeting the needs of customers, employees, and stakeholders
-

Approach

Cryotech's sustainability team coordinates and facilitates activities related to three pillars of sustainability:

- ❖ **Business** - Sound and ethical business practices (products, market, brand, profit, and corporate)
- ❖ **Environment** - Responsible stewardship of resources (energy, materials, and natural resources)
- ❖ **People** - Engage stakeholders (employees, customers, suppliers, distributors, community, and regulators)

Cryotech uses the ISO 9001 Quality and ISO 14001 Environmental Standards to systematize its approach to sustainability.

Objectives

- ❖ Create innovative approaches to minimizing environmental impacts in the areas of waste, energy, water, and air quality
 - ❖ Ensure every aspect of the supply chain has responsibly integrated social and environmental practices
 - ❖ Improve economic performance by streamlining operations
 - ❖ Give back to the community by volunteering and donating resources
-

6103 Orthoway, Fort Madison, IA 52627 Tel: +1 (319) 372-6012 +1 (800) 346-7237 Fax: +1 (319) 372-2662
E-mail: deicers@cryotech.com <http://www.cryotech.com> Form #EMS-D004, Rev. 6/17/15

NOTICE PROPRIETARY INFORMATION: THIS DOCUMENT IS THE PROPERTY OF GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION dba Cryotech Deicing Technology. THE INFORMATION CONTAINED HEREIN IS SUBMITTED IN CONFIDENCE. IT CONTAINS TRADE SECRETS OR CONFIDENTIAL COMMERCIAL OR FINANCIAL INFORMATION EXEMPT FROM DISCLOSURE BY 5 U.S.C. SECTION 552(B)(3) AND (4) (FREEDOM OF INFORMATION ACT), AND 18 U.S.C. SECTION 1905 (TRADE SECRETS ACT), EXCEPT WITH THE WRITTEN CONSENT OF GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION dba Cryotech Deicing Technology. (1) THIS DOCUMENT MAY NOT BE COPIED IN WHOLE OR IN PART AND WILL BE RETURNED UPON REQUEST OR WHEN NO LONGER NEEDED BY RECIPIENT AND (2) INFORMATION CONTAINED HEREIN MAY NOT BE COMMUNICATED TO OTHERS AND MAY BE USED BY RECIPIENT ONLY FOR THE PURPOSE FOR WHICH IT WAS TRANSMITTED.



CRYOTECH DEICING TECHNOLOGY SUSTAINABILITY POLICY

Actions and Results

❖ **Business**

- Growing consistently over 20 years
- Maintaining ISO 9001 and ISO 14001 certifications through internal and external audits
- Commercializing products made from renewable resources
- Funding research into the development of environmentally friendly products
- Working with customers to maximize chemical effectiveness and reduce environmental impacts
- Participating with other businesses and local industries in “Sustainability Circles” for learning and sharing of best practices
- Providing a recycling program for customers return of product containers such as totes and drums
- Minimizing environmental costs of shipping and support to local communities by producing liquid deicers regionally and utilizing product storage facilities throughout the U.S.
- Distributing product and company information to customers via a link and/or website

❖ **Environment**

- Applying the 4R's (refuse/reduce/reuse/recycle) in manufacturing
- Recycling when available
 - Paper, cardboard, shrink-wrap, CD's/DVD's, printer cartridges, ink and toner cartridges, and used toner are recycled on-site
 - Spent aerosol cans and batteries are recycled with an outside vendor
 - Rechargeable batteries are used – computers recycled
- Reducing and maximizing lighting, appliances, and electronics
 - Replacement of inefficient lighting with US EPA Energy Star systems and LED fixtures
 - Since 2007, lighting upgrades alone have reduced carbon emissions by 160 ton/year
 - Replacement of appliances with Energy Star rated units
- Focusing on numerous environmental improvement objectives
 - Containment of raw material storage tanks
 - Improving environmental aspects of products
 - Computerization of maintenance work lists, stock items, etc.
 - Ordering MRO (maintenance, repair, and operating) supplies and raw materials electronically
 - Selecting specific products for purchase to minimize waste; i.e., one brand and color of spray paint
 - Maintaining electronic customer documents and utilizing on-line ordering systems
 - Utilizing copiers with duplex printing options
 - Accessing internal web and server sites by employees for information updates and document management
 - Purchasing alternatives to aerosol products when available



- Environmentally Preferable Product Attributes
 - Introduction of Cryotech E36® and NAAC® Runway Deicers to the industry to improve the environmental impact of the existing approved runway products such as glycols and urea
 - Development of Cryotech BX36® Liquid Runway Deicer, the first bio-based fluid introduced to the market and approved for runway use, containing 75% bio-based content with a corn derived raw material
 - Invention of Cryotech Polar Plus® LT, a Type I Aircraft Deicer that uses bio-based raw materials and is specially formulated to have very low aquatic toxicity
 - Maintaining high product environmental standards with Cryotech deicers that are non-hazardous, non-toxic, carcinogen-free, and heavy metal free
- Production
 - Production of solid deicers utilizes a zero waste process
 - Resizing of steam traps to reduce boiler gas usage by 15 – 20% for improved natural gas efficiency
 - Replacement of oversized, inefficient pumps in liquid production area
 - Installation of variable speed pumps to maximize efficiency
 - Replacement of conveyors and bucket elevators with more energy efficient methods saving over 100 hp in electric usage
 - Supply of utility air by a variable speed air compressor that uses waste heat from the compressor to dry the air
 - Purchasing of bio-based raw materials including a bio-propylene glycol used in Cryotech Polar Plus® and Cryotech Polar Guard® Advance Aircraft Deicers, as well as a corn-based propanediol (PDO) product used in BX36 Runway Deicer

❖ People

- Promoting employee health and wellness through the *Energize* Wellness Program and monthly safety meetings
- Incorporation of ergonomic office furniture to minimize stress and injury
- Creating and maintaining strong employee, customer, and supplier partnerships
- Participating in industry groups that drive new standards for products and environmental performance
- Encouraging employee volunteering and community involvement – Relay for Life, United Way, local Food Pantry, and Blood Drives

General Atomics International Services Corporation dba Cryotech Deicing Technology

Trade References

Altorfer, Inc.
2600 6th Street, SW
Cedar Rapids, IA 52404
(319) 365-0551 phone
(319) 365-5639 fax
Contact: Ted Lawler

Erco Worldwide
101 State Hwy. 73 South
Nekoosa, WI 54457
(715) 887-4575 phone
(416) 234-7435 fax
Contact: John Keough
Email: jkeough@ercoworldwide.com

Potterfield Trucking
R.R. 1, Box 225A
Monroe City, MO 63456
(573) 735-4528 phone
(573) 735-4399 fax
Contact: Phillip Potterfield

Van Meter Industrial
116 Carbide Lane
Keokuk, IA 52632
(319) 524-3923 phone
(319) 524-3926 fax

Jumbo Sack/Cratex Corp.
2677 Metro Boulevard
Maryland Heights, MO 63043
(314) 291-7777 phone
(314) 291-0045 fax
Contact: Michael Reynoso

BP Chemicals
150 W. Warrenville Road
Naperville, IL 60563-8460
(877) 701-2726 phone
(630) 961-7800 fax
Contact: Lou Williams

ACORD™

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

03/03/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Marsh & McLennan Agency LLC CA License #0H18131 P.O. Box 85638 San Diego, CA 92122	CONTACT NAME: Vanessa Suarez	FAX (A/C, No): 858-529-2670
	PHONE (A/C, No, Ext): 858-242-5770	E-MAIL ADDRESS: Vanessa.Suarez@mma-west.com
INSURED General Atomics Attn: Roseanne Hovey P.O. Box 85608 San Diego, CA 92186	INSURER(S) AFFORDING COVERAGE	
	INSURER A: Allied World National Assurance	NAIC #: 10690
	INSURER B: Starr Indemnity and Liability C	
	INSURER C:	
	INSURER D: Hartford Fire Insurance Company	19682
	INSURER E:	
INSURER F:		

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL SUBR INSR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> SIR: \$500,000 GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC		03064218	02/28/2015	02/28/2016	EACH OCCURRENCE \$1,500,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$100,000 MED EXP (Any one person) \$Excluded PERSONAL & ADV INJURY \$1,500,000 GENERAL AGGREGATE \$1,500,000 PRODUCTS - COMP/OP AGG \$1,500,000 \$
D	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS		72UENZN7492 Physical Damage not covered	02/28/2015	02/28/2016	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ Deductible \$75,000
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$10,000		03053651	02/28/2015	02/28/2016	EACH OCCURRENCE \$10,000,000 AGGREGATE \$10,000,000 \$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? <input checked="" type="checkbox"/> N (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	1000001073	12/01/2014	12/01/2015	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Evidence of insurance.

CERTIFICATE HOLDER

CANCELLATION

Cryotech/General Atomics
6103 Ortho Way RR43
Fort Madison, IA 52627

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Vanessa Suarez

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By Royal Charter

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2008

This is to certify that:

Cryotech Deicing Technology
6103 Orthoway
Fort Madison
Iowa
52627
USA

Holds Certificate No:

FM 39092

and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:

The development, production and sales of environmentally benign deicing materials.

For and on behalf of BSI:

Pietro Foschi - Strategic Delivery Director

Originally registered: 03/12/1998

Latest Issue: 11/20/2014

Expiry Date: 11/19/2017



Page: 1 of 1

...making excellence a habit.™

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2004

This is to certify that:

Cryotech Deicing Technology
6103 Orthoway
Fort Madison
Iowa
52627
USA

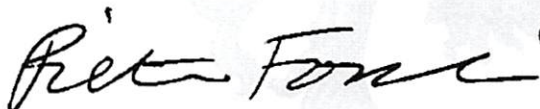
Holds Certificate No:

EMS 89384

and operates an Environmental Management System which complies with the requirements of ISO 14001:2004 for the following scope:

The management of environmental risks associated with mixing, drying and individual and bulk packaging of benign deicing solid and liquid materials that include use of Propylene Glycol, Potassium Hydroxide, Sodium Hydroxide and Acetic Acid and minimum support for remediation from prior land owner

For and on behalf of BSI:



Pietro Foschi - Strategic Delivery Director

Originally registered: 07/12/2005

Latest Issue: 11/20/2014

Expiry Date: 11/17/2016



Page: 1 of 1

...making excellence a habit.™

This certificate remains the property of BSI and shall be returned immediately upon request.

An electronic certificate can be authenticated [online](http://www.bsigroup.com/ClientDirectory). Printed copies can be validated at www.bsigroup.com/ClientDirectory. To be read in conjunction with the scope above or the attached appendix.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 845 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.



A NOTICE AND INVITATION TO ALL EMPLOYEES AND APPLICANTS

AFFIRMATIVE ACTION AND EQUAL EMPLOYMENT OPPORTUNITY POLICY STATEMENT

General Atomics International Services Corporation dba Cryotech Deicing Technology, (the "Company") has been and will continue to be an equal opportunity employer and does not discriminate against any applicants or employees on the basis of race, color, national origin, gender, age, pregnancy, religion, disability, genetic information, protected veteran status, sex, sexual orientation, gender identity, or any other basis protected by local, state, or federal law. In an effort to support this policy, and as part of our requirement as a federal contractor, the Company continues to develop and implement an affirmative action plan (an "AAP") which sets forth the Company's practices and programs in an effort to achieve equal employment opportunities. To ensure full implementation of this policy and AAP, the Company assures that:

- a. Equal employment opportunity will be extended to all individuals in all aspects of the employment relationship, including recruiting, hiring, training, promoting, compensating, transferring, disciplining, demoting, laying off, terminating and all other employment decisions affecting wages, benefits, hours, and other terms, conditions, or privileges of employment.
- b. Applicants and employees shall not be subjected to harassment, intimidation, threats, coercion, or discrimination because they have: (1) filed a complaint about any act or practice made unlawful by any local, state, or federal law requiring equal employment opportunity; (2) opposed any act or practice made unlawful by any local, state, or federal law requiring equal employment opportunity; (3) assisted or participated in an investigation, compliance review hearing, or any other activity related to the administration of any local, state, or federal law requiring equal employment opportunity; or (4) exercised any other right protected by local, state, or federal law requiring equal employment opportunity.

Lisa Schlosser has been selected as the Company's Equal Employment Opportunity ("EEO") Officer and as such is responsible for the day to day implementation and monitoring of our Equal Employment Opportunity Policy and our AAP. As part of that responsibility, she will periodically analyze the Company's personnel actions and their effects to ensure compliance with our equal employment policy.

If an employee or an applicant for employment has any questions about this policy or would like to file a complaint, please contact Lisa Schlosser at 858-455-3899 or lisa.schlosser@ga.com, or 3550 General Atomics Court, San Diego, CA 92121, attn: HR Compliance.

I have reviewed and fully endorse our Affirmative Action and Equal Employment Opportunity program. In closing, I ask the continued assistance and support of all of the Company's personnel to attain our objective of equal employment opportunity for all.

A handwritten signature in blue ink that reads "Craig E. Starwalt".

Craig E. Starwalt
President and Chief Executive Officer



Cryotech Deicing Technology is certified to ISO 9001:2008 and 14001:2004 standards. Customers often ask why these certifications are important enough to be made part of bid specifications. This document attempts to answer that question.

What is ISO?

The abbreviation "ISO" stands for International Organization for Standardization. ISO is a series of international standards introduced in 1987 that define and structure a company's management systems. These standards apply equally to all industries and require companies seeking certification to define how their systems meet the standards' rigorous requirements. Meeting the standards assures customers that all vendor company activities – design, manufacturing, production, purchasing, quality control, packaging, handling, storage, shipping, and customer service – are appropriately managed and controlled.

What is the difference between ISO 9000 and 14000?

ISO 9000 is concerned with "quality management." This means what the organization does to enhance customer satisfaction by meeting customer and applicable regulatory requirements and continually improving its performance in this regard.

ISO 14000 is primarily concerned with "environmental management." This means what the organization does to minimize harmful effects on the environment caused by its activities and continually improving its environmental performance.

Can any vendor be ISO-certified?

Yes. There are approximately 250,000 companies worldwide registered to ISO standards. Any company willing to make the effort can be certified.

Why should I require vendors to be ISO-certified?

- ISO is direct evidence of a company's financial and ethical commitment to provide high quality, safe products.
- ISO certified companies maintain comprehensive internal audit programs that demonstrate to customers the effectiveness of their quality and environmental efforts.
- ISO certified companies utilize systems that have been accepted for use by over 80 countries as effective means to achieve product quality and environmental stewardship.
- ISO certified companies document, review, and approve product designs that meet applicable safety, regulatory, and customer requirements.
- ISO certified companies prove their systems through audits by independent registrars. Registrars are governed by strict international codes that dictate operating practices, audit methods, and staff qualifications. Failure to maintain quality program requirements will lead to de-certification by the registrar.
- ISO certified company products reduce the need for the buyers to perform audits and reviews to determine if quality systems are in place and being maintained.
- A certificate of analysis from an ISO certified company will be supported by documented procedures and records that demonstrate its validity. This is particularly important should a customer ever have a reason to question product quality.



NOTICE OF ANTI-HARASSMENT POLICY AND COMPLAINT PROCEDURE

General Atomics International Service Corporation dba Cryotech Deicing Technology, (the "Company") is committed to providing a work environment free of unlawful harassment. This memo is reissued, as it is our intention to continue stressing the importance of the Company's Anti-Harassment policy and complaint procedure. Company policy prohibits harassment based on race, color, national origin, gender, age, pregnancy, religion, disability, genetic information, protected veteran status, sex, sexual orientation, gender identity, or any other basis protected by local, state or federal law. The Company's anti-harassment policy applies to all persons involved in the operation of the Company and prohibits unlawful harassment by any employee of the Company, including supervisors and managers. The Company's anti-harassment policy also applies to non-employees with whom the employees come into contact in the course of employment (e.g. service providers, vendors, contractors or customers).

The Company requires all employees to report any incidents of unlawful harassment immediately. Such reports may be made to the employee's supervisor, their supervisor's manager, Human Resources, or the Company's anonymous hotline at (866) 583-5542. Supervisors and Managers will refer all complaints of unlawful harassment to the Human Resources Department and the Company will promptly undertake a thorough investigation of the allegations.

Unlawful harassment will not be tolerated. Violations of this policy will result in disciplinary action, up to, and including termination. Additionally, the Company prohibits retaliation against an employee for making a good faith complaint under this policy or for assisting in an investigation.

We trust and expect that all employees of the Company will continue to act responsibly to maintain a pleasant working environment free of unlawful harassment of any type. Thank you for your continued support towards these efforts.

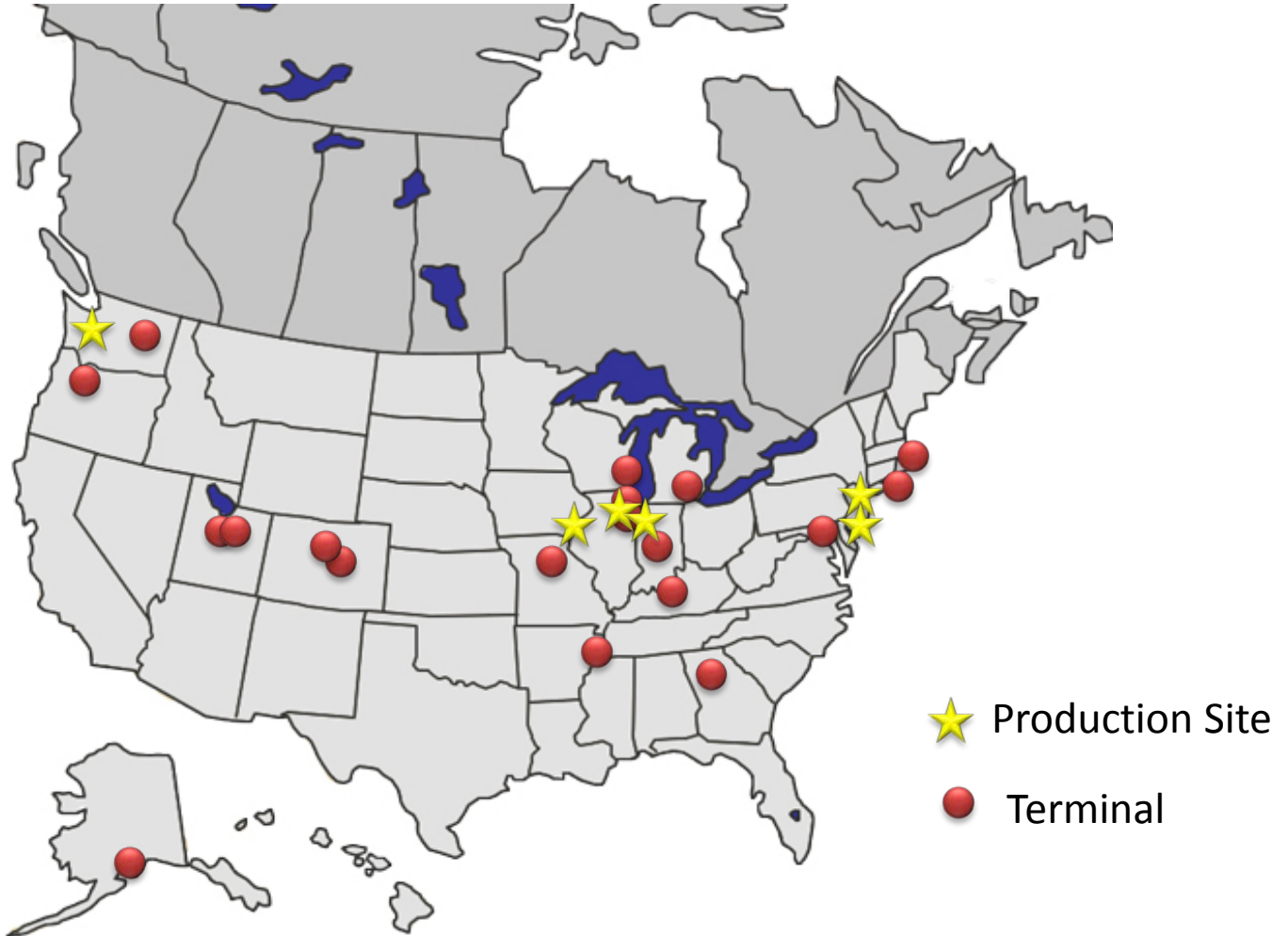
A handwritten signature in blue ink, reading "Craig Starwalt".

Craig E. Starwalt
President and Chief Executive Officer

DISTRIBUTION MAP

2015 Cryotech Operations

Cryotech Confidential



Cryotech partners with carriers across the United States for preloaded trailer staging as needed to meet weathers demands and customer needs.



CRYOTECH ORDER PROCEDURE

Orders for the following Cryotech products should be placed as shown below.

CUSTOMER NAME: LOCATION(S):

CRYOTECH PRODUCTS (applicable products checked)

- ☐ Cryotech Polar Guard Type IV Aircraft Fluid
- ☐ Cryotech Polar Guard Advance Type IV Aircraft Fluid
- ☐ Cryotech Polar Plus Type I Aircraft Fluid, Concentrate and/or Dilute
- ☐ Cryotech Polar Plus LT Type I Aircraft Fluid, Concentrate and/or Dilute
- ☐ Cryotech Polar Shield TKS In-Flight Ice Prevention Fluid
- ☐ E36 Liquid Runway Deicer
- ☐ E36 Lavatory Antifreeze
- ☐ Glacier RF Ready to Use Lavatory Fluid
- ☐ NAAC Commercial Deicer
- ☐ NAAC Solid Runway Deicer
- ☐ XT360 Liquid Runway Deicer
- ☐ XT360 Lavatory Antifreeze
- ☐ Other

ORDER PROCESS

Normal business hours: 7:30 a.m. to 4:00 p.m., Monday through Friday

Account Representative: Email:

- Call Cryotech at **800-346-7237** or **319-372-6012**. Cryotech will need to know:
 - a. Product that you are ordering
 - b. Delivery location address
 - c. Requested delivery date and receiving hours
 - d. Receiving location contact & phone number for delivery confirmation or questions
 - e. Quantity requested
 - f. Requestor name and P.O. number
 - g. Other special delivery or receiving requirements (fittings, hose, etc.)

After normal business hours or during holidays: (24/7 availability Nov. 1 thru March 31st)

- Call Cryotech at 800-346-7237 to reach our after hours voice mail system. Listen for the prompts to place an urgent deicer order or to leave a message for pick up on the next business day.
- If after 20 minutes, you have not received a response from Cryotech, call the Cryotech cell phone numbers listed below.

CRYOTECH	CONTACTS	Cellular
After Hours	800-346-7237 or as below	
Customer Service	Customer Service On-Call	319-470-4631
	Roxanna Huffman	319-470-4784
	Ashley Rung	319-371-0694

Cryotech can also be reached, on a non-emergency basis, by e-mail to orders@cryotech.com.

NOTE: Schutz style totes (8 minimum) may be picked up when empty by calling 888-724-8389.

MX

ECOBULK MX

The perfect solution for filling goods with high density.



The **ECOBULK MX**, with integrated bottom plate, offers superior stability and best protection to the inner container. Additional distinguishing features of the high-quality IBC system are easy discharge of contents and outstanding service life. ECOBULK MX components are made, without exception, for reconditioning and thereby meet the demand for multi-trip capabilities of transport packaging.

SCHÜTZ
INDUSTRIAL PACKAGING

MATERIAL

- Inner container**
- extrusion blow-moulded HDPE
 - SMP protective barrier on request
- Outer jacket**
- welded tubular steel grid
 - galvanized
- Bottom plate**
- made of steel plate to provide stability and to facilitate easy removal of residuals of the inner container

PALLETS

4-way entry



CERTIFICATIONS

- UN 31 HA1/Y FDA**
- with wooden pallet **max. density 1.9**
 - with plastic pallet **max. density 1.9**
 - with steel pallet **max. density 1.9**
 - with full-plastic pallet **max. density 1.9**

CAPACITIES

- MX 640**
640 litre (170 gal)
- MX 820**
820 litre (220 gal)
- MX 1000**
1,000 litre (275 gal)
- MX 1250**
1,250 litre (330 gal)

FILLING OPENING

- DN 150 with screw cap
- DN 225 with screw cap
- DN 400 with clamp-ring lid

OUTLET VALVES

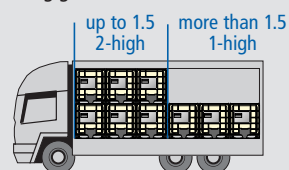
- integrated butterfly valve DN 50
- threaded butterfly valve DN 50 or DN 80, DN 150 also available
- threaded ball valve DN 50

DIMENSIONS

- MX 640**
1,200 x 800 x 1,000 (L x B x H)
- MX 820**
1,200 x 1,000 x 1,000 (L x B x H)
- MX 1000**
1,200 x 1,000 x 1,160 (L x B x H)
- MX 1250**
1,200 x 1,000 x 1,350 (L x B x H)

DYNAMIC LOAD

Filled ECOBULKS according to specific weight of the filling goods



WEIGHT

- MX 640**
55 kg (TP), 51 kg (PP), 46 kg (SP)
- MX 820**
61 kg (TP), 57 kg (PP), 54 kg (SP)
- MX 1000**
66 kg (TP), 63 kg (PP), 59 kg (SP), 64 kg (FPP)
- MX 1250**
75 kg (TP), 72 kg (PP), 68 kg (SP)

STATIC LOAD

max.
4-high



MX

ECOBULK MX

SCHÜTZ

INDUSTRIAL PACKAGING

The outlet valves from SCHÜTZ.



*integrated
butterfly valve DN 50*



*threaded
butterfly valve DN 50*



*threaded
butterfly valve DN 80*



*threaded
ball valve DN 50*

The ECOBULK MX offers the greatest possible volume in the minimum of space. The IBC system is designed for the safe transport of hazardous goods up to the specific weight of 1.9. Quick to fill, easy to stack, easy to load.

User-oriented outlet valves ensure safe and **precise control of discharging filling goods of various viscosities**. A large selection of sealing materials provide resistance to various fittings of most filling mediums.

In addition to environment-friendly production of transport containers the **SCHÜTZ TICKET SERVICE** significantly contributes to the conservation of resources and to the protection of natural foundations of life: by means of conserving raw materials our unique collection and reconditioning system relieves the strain on our environment.

SCHÜTZ (UK) Ltd.
Claylands Av. Dukeries Ind.Est.
GB-Workop, Notts.S81 7BE
Phone (+44) 1909-478863
Fax (+44) 1909-478864

SCHÜTZ France S.A.R.L.
Chemin du Buisson Gayet
F-91460 Marcoussis
Phone (+33) 1-69805000
Fax (+33) 1-64493044

SCHÜTZ Iberica S.L.
Poligono 37, Finca 10
E-43480 Vilaseca (Tarragona)

INDUSTRIAL PACKAGING
Phone (+34) 977-391023
Fax (+34) 977-391063

ENERGY SYSTEMS
Phone (+34) 977-394190
Fax (+34) 977-391299

SCHÜTZ (Italia) S.r.l.
Via del Boscone
I-25014 Castenedolo (BS)
Phone (+39) 030-2134711
Fax (+39) 030-2134720

SCHÜTZ Polska
ul. Instalatorow 5
PL-02-237 Warszawa
Phone (+48) 22-8463405
Fax (+48) 22-8680440

SCHÜTZ Nordic AS
Norvald Strands vei 162
N-2206 Kongsvinger
Phone (+47) 62-822750
Fax (+47) 62-822751

SCHÜTZ (Ireland) Ltd.
Townamore, Killala
IRL-Co. Mayo
Phone (+353) 9633044
Fax (+353) 9633045

Headquarters USA
SCHÜTZ Container Systems
200 Aspen Hill Road
US-North Branch,
NJ 08876-5950
Phone (+1) 908-5266161
Fax (+1) 908-5260550

SCHÜTZ Mexico
Envases y Laminados
S.A. de C.V., Av. 1 No. 12A
Parque Industrial Cartagena
54900 Tultitlan
Edo. de Mexico
Phone (+1) 877-315-7061
Fax (+1) 877-290-8648

ITA-Industrias Termoplasticas
Argentinas S.A.
Ruta 5 Km. 75
6707-Jauregui-Buenos Aires
Argentina
Phone (+54) 2323-497-596
Fax (+54) 2323-497-844

SCHÜTZ do Brasil
Rua João Batista
Nogueira 550- parte
07231-410 - Guarulhos-
São Paulo
Phone (+55) 116412-5177
Fax (+55) 116412-3331

Furukawa Altec Co., Ltd.
Furukawa Electric Kanda Bld.
2-16-8 Uchikanda Chiyoda-Ku
Tokyo 101-0047, Japan
Phone (+81) 3-5295-4050
Fax (+81) 3-5295-4503

DSL Pty Ltd.
152 Cockburn Road
South Fremantle WA 6162
Australia
Phone (+61) 893362688
Fax (+61) 893366052

SCHÜTZ GmbH & Co. KGaA
Schützstraße 12
D-56242 Selters
Phone + 49 (0) 2626/77-0
Fax + 49 (0) 2626/77-365
E-Mail: info1@schuetz.net
www.schuetz.net

CRYOTECH CF7[®]

Liquid Commercial Deicer



BENEFITS

- Non-chloride based, low corrosion
- Liquid formulation works fast, on contact
- Easy to handle, no agitation required
- Can be used for anti-icing, deicing, and prewetting solid
- Good tire tracking
- Is not slippery like common deicers
- Complimentary customer training upon request

PERFORMANCE

- Has low freeze point of -76°F (-60°C)
- Effective to -25°F (-32°C)
- When used as an anti-icer, CF7 prevents bonding of snow/ice to pavement
- When used as a deicer, CF7 breaks snow/ice bonds prior to mechanical removal
- Does not refreeze as fast as common deicers, the residual effect requires fewer applications

ENVIRONMENT

- Non-persistent, readily biodegrades at low temperatures
- Low BOD and toxicity to fish, mammals, and vegetation
- Does not contain nitrogen or chlorides
- Recognized as “relatively harmless” by the U.S. Fish and Wildlife scale

APPLICATION

- Prewetting: Apply at spreader outlet at a rate of 1.25 gallons per 100 lbs (130 g/kg) of solid deicer, such as Cryotech NAAC[®]
- Anti-icing: Commercial = 0.5 gallons/1000ft² (25-50 g/m²)
Highway = 25-60 gallons/lane mile (25-50 g/m²)
- Deicing: Commercial = 1-3 gallons/1000ft² (50-150 g/m²)
Highway = 60-180 gallons/lane mile (50-150 g/m²)
- Re-apply when new snow/ice accumulation shows first tendency to bond
- Plow promptly to reduce fluid dilution

HANDLING

- CF7 should not be stored or plumbed through systems that use galvanized, zinc, or brass components (may be used on or around galvanized bridge and parking deck components, signage, and guardrails)
- Polyethylene or stainless steel containers are preferred, otherwise use carbon or low alloy steel
- Best practices include storing totes and drums in areas protected from weather and exposure to direct sunlight
- Containers must be clean and free of rust, surface deposits, and residues

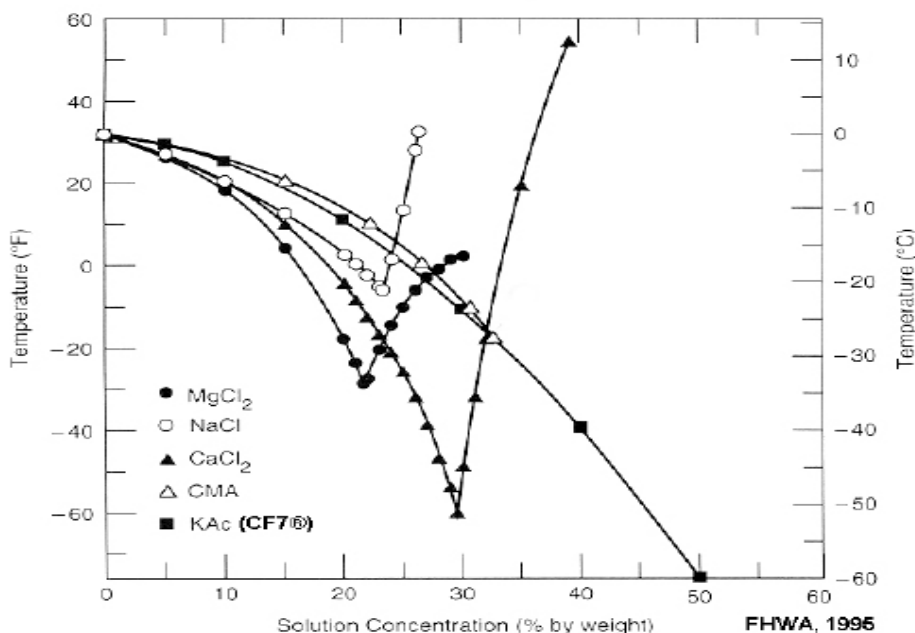
See Reverse Side For Product Specifications
Test Data Available Upon Request
ISO 9001:2008 & 14001:2004 CERTIFIED COMPANY



PRODUCT SPECIFICATIONS - CRYOTECH CF7®

COMPOSITION	50% aqueous potassium acetate solution, by weight, plus corrosion inhibitors
APPEARANCE	Clear, colorless*, mobile liquid, free from matter in suspension
DENSITY	At 68°F (20°C) = 10.68 lbs/gallon (1.28 g/cm ³)
VISCOSITY	At 68°F (20°C) = 10cP maximum At 32°F (0°C) = 20cP maximum
FLASH POINT	Nonflammable
FREEZING POINT	-76°F (-60°C)
MISCIBILITY WITH WATER	Complete
TYPICAL pH	10.5 to 11.5
SPECIFIC GRAVITY	At 68°F (20°C) = 1.25 - 1.30
PACKAGING	55 gallon drums (208 liters) - 4 drum minimum 265 gallon tote (1003 liters) - 1 tote minimum Bulk - 4400 gallons (16,656 liters) minimum * MAY BE DYED BLUE AT CUSTOMER REQUEST

Refreeze Temperatures



TO ORDER OR FOR PRODUCT INFORMATION CONTACT:

Ph: +1 319.372.6012 or +1 800.346.7237 Fax: +1 319.372.2662

E-mail: deicers@cryotech.com

Cryotech Deicing Technology . 6103 Orthoway . Fort Madison, IA . 52627
WWW.CRYOTECH.COM



ISO 14001
EMS 89384



ISO 9001
FM 39092



CRYOTECH CF7[®]

Liquid Commercial Deicer

Safety Data Sheet

Section 1: IDENTIFICATION

PRODUCT IDENTIFIER

CRYOTECH CF7[®]

Liquid Commercial Deicer

RECOMMENDED USE OF CHEMICAL AND RESTRICTIONS ON USE

Deicing/anti-icing highways, bridges, parking lots, and other pavements.

DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Name/Address: Cryotech Deicing Technology
6103 Orthoway
Fort Madison, IA 52627
United States

Contact Information: Telephone: (800) 346-7237
Fax: (319) 372-2662
Email: deicers@cryotech.com
Website: www.cryotech.com

EMERGENCY TELEPHONE NUMBER

CHEMTREC (800) 424-9300
Outside continental USA (703) 527-3887

Section 2: HAZARD(S) IDENTIFICATION

CLASSIFICATION ACCORDING TO OSHA HAZCOM 2012

Hazard Class Not classified as hazardous

LABEL ELEMENTS ACCORDING TO OSHA HAZCOM 2012

There are no OSHA required label elements for this product.

CLASSIFICATION ACCORDING TO WHMIS (Canada)

Hazard Class Not controlled

WHMIS Hazard Symbols Not applicable

WHMIS Signal Word Not applicable

POTENTIAL HEALTH EFFECTS

Eye Contact May cause temporary eye irritation. Corneal injury is unlikely.

Skin Contact Repeated contact may cause slight skin irritation or dry skin.

Inhalation May cause irritation or coughing.

Ingestion Ingestion of large quantities may cause nausea, vomiting, diarrhea and abdominal discomfort.

Effects of repeated exposure No effects other than described above are expected.



CRYOTECH CF7[®]

Liquid Commercial Deicer

Safety Data Sheet

Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

MIXTURES

Ingredient	CAS No	Wt. %
Potassium Acetate	127-08-2	50
Water	7732-18-5	50
Corrosion Inhibitors		< 1

Section 4: FIRST- AID MEASURES

DESCRIPTION OF FIRST AID MEASURE

Eye	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. If irritation persists, seek medical attention.
Skin	As a precaution, wash skin thoroughly with soap and water. Remove and wash contaminated clothing.
Inhalation	If inhaled, remove to fresh air and get medical advice
Ingestion	If swallowed, give milk or water to drink and telephone for medical advice. Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

MOST IMPORTANT SYMPTOMS / EFFECTS

Eye	May cause eye irritation. Symptoms may include temporary discomfort or pain, excess blinking and tear production, with possible redness and swelling.
Skin	May cause itching or irritation of any cut or abraded skin. Symptoms of prolonged contact may include dry skin.
Inhalation	Inhalation of aerosol during spraying may cause respiratory tract irritation and coughing. This product is not otherwise expected to be an inhalation hazard.
Ingestion	Ingestion of large quantities may cause nausea, vomiting, diarrhea and abdominal discomfort.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT

Note to physicians	This product contains potassium acetate. Though ingestion of large amounts of potassium salts usually results in vomiting, excessive potassium absorption can cause hyperkalemia.
Specific treatments	If you feel unwell, seek medical advice immediately. Show the label or safety data sheet to medical personnel if possible.



CRYOTECH CF7[®]

Liquid Commercial Deicer

Safety Data Sheet

Section 5: FIRE FIGHTING MEASURES

FLAMMABILITY

Flash Point (close cup)	Nonflammable by OSHA/WHMIS criteria
Auto Ignition	Not applicable

EXTINGUISHING MEDIA

Suitable Extinguishing Media	Water, carbon dioxide, or dry chemical. Use extinguishing media appropriate for surrounding materials.
Unsuitable Extinguishing Media	Not applicable

SPECIAL HAZARDS

Hazardous Combustion Products	Normal combustion forms carbon dioxide and water.
Explosion Limits	Data not available. Not considered to be an explosion hazard.
Unusual Fire Hazards	None expected

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS

Special Protective Equipment for Firefighters	Wear NIOSH approved self-contained breathing apparatus (SCBA) with positive air pressure.
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Section 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES

Avoid eye/skin contact with spilled material. Refer to Section 7 for additional handling precautions

Methods for Containment	Contain and/or absorb spill with inert material (e.g. sawdust, sand, vermiculite).
Methods for Cleaning-Up	Scoop up material and transfer to disposal container. If needed, wash spillage area with plenty of water.

Section 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING

Handling	Avoid eye contact. Avoid breathing mist when spraying.
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PRECAUTIONS FOR SAFE STORAGE, INCLUDING ANY COMPATIBILITIES

Storage	Store in tightly sealed original containers, away from direct heat and strong oxidizing agents. Do not store or handle product in systems constructed of wetted parts consisting of galvanized steel, zinc, or brass components.
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CRYOTECH CF7[®]

Liquid Commercial Deicer

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Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

Exposure Limits

No specific limits have been established for this product.

EXPOSURE CONTROLS

Engineering Controls

No special ventilation is usually necessary; however if operating conditions create high airborne concentrations of this material, special ventilation may be needed to keep exposure to airborne contaminants below the exposure limit.

INDIVIDUAL PROTECTIVE MEASURES/PERSONAL PROTECTIVE EQUIPMENT

Eye Protection

Safety glasses or goggles are recommended if splashing/spraying is possible.

Skin Protection

No special skin protection is usually necessary. Chemical-resistant gloves and clothing should be used if prolonged exposure is possible to prevent drying of skin.

Respiratory Protection

No special respiratory protection is usually necessary. Breathing of mist/aerosol should be avoided. If operating conditions create high airborne concentrations of this material, the use of an approved respirator is recommended.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	Clear, colorless to light straw colored liquid. (May be dyed blue at customer request.)
ODOR	Odorless to slight vinegar odor
ODOR THRESHOLD	No data available
pH (20°C, 68°F)	10.5 – 11.5
FREEZING POINT	-60°C (-76°F)
BOILING POINT	~ 110°C (230°F)
FLASH POINT	Not applicable
EVAPORATION RATE	No data available
FLAMMABILITY/EXPLOSION LIMITS	Not applicable
VAPOR PRESSURE (20°C)	15 mm Hg
VAPOR DENSITY (AIR = 1)	No data available
RELATIVE DENSITY	1.28
SOLUBILITY IN WATER	Completely miscible
PARTITION COEFFICIENT; n-OCTANOL/WATER	No data available
AUTO-IGNITION TEMPERATURE	No data available
DECOMPOSITION TEMPERATURE	No data available
VISCOSITY (20°C)	6.5 cP
OXIDIZING PROPERTIES	Not oxidizing
EXPLOSIVE PROPERTIES	Not explosive



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Section 10: STABILITY AND REACTIVITY

REACTIVITY

No dangerous reactions known under conditions of normal use.

CHEMICAL STABILITY

Stable. Polymerization will not occur.

POSSIBILITY OF HAZARDOUS REACTIONS

No dangerous reactions known under conditions of normal use.

CONDITIONS TO AVOID

Avoid prolonged contact with reactive metals such as magnesium and zinc, especially in closed systems where hydrogen gas from the oxidation of these materials may accumulate over time.

INCOMPATIBLE MATERIALS

Strong oxidizing agents; strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

May decompose into oxides of carbon.

Section 11: TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

LD50 rat-oral: > 5 g/kg.

LIKELY ROUTES OF EXPOSURE

Skin contact, eye contact, ingestion.

SYMPTOMS RELATED TO THE PHYSICAL, CHEMICAL, AND TOXICOLOGICAL CHARACTERISTICS

Eye	May cause eye irritation. Symptoms may include temporary discomfort or pain, excess blinking and tear production, with possible redness and swelling.
Skin	May cause itching or irritation of any cut or abraded skin. Symptoms of prolonged contact may include dry skin.
Inhalation	Inhalation of aerosol during spraying may cause respiratory tract irritation and coughing. This product is not otherwise expected to be an inhalation hazard.
Ingestion	Ingestion of large quantities may cause nausea, vomiting, diarrhea and abdominal discomfort.

DELAYED AND IMMEDIATE EFFECTS AND CHRONIC EFFECTS FROM SHORT- AND LONG-TERM EXPOSURE/NUMERICAL MEASURES OF TOXICITY

Skin Corrosion/Irritation	Based on available data, the classification criteria are not met.
Serious Eye Damage/Irritation	Based on available data, the classification criteria are not met.
Respiratory or Skin Sensitization	Based on available data, the classification criteria are not met.
Germ Cell Mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	This product does not contain any ingredients that are considered to be carcinogens by IARC, NTP, or OSHA.



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Reproductive Toxicity
STOT-Single Exposure
STOT-Repeated Exposure
Aspiration Hazard

Based on available data, the classification criteria are not met.
Based on available data, the classification criteria are not met.
Based on available data, the classification criteria are not met.
Based on available data, the classification criteria are not met.

Section 12: ECOLOGICAL INFORMATION

ECOTOXICITY (AQUATIC AND TERRESTRIAL)

Not expected to cause long-term adverse effects in the aquatic or terrestrial environments.

PERSISTENCE AND DEGRADABILITY

Readily biodegradable. COD (TOD): 0.34 g O₂/g deicer; BOD₅ (20°C): 0.25 g O₂/g deicer

BIOACCUMULATIVE POTENTIAL

Bioaccumulation is not expected.

MOBILITY IN SOIL

Adverse effects not expected.

OTHER ADVERSE EFFECTS

None expected.

Section 13: DISPOSAL CONSIDERATIONS

WASTE TREATMENT AND METHODS OF DISPOSAL

Based on available information, this product is neither listed as a hazardous waste nor does it exhibit any of the characteristics that would cause it to be classified as a characterized hazardous waste under RCRA. This product may be absorbed onto suitable materials and disposed of in a sanitary landfill unless local, state, or provincial regulations prohibit such disposal.

Section 14: TRANSPORT INFORMATION

TRANSPORT INFORMATION

Not regulated as dangerous goods per US DOT or IATA.



CRYOTECH CF7[®]

Liquid Commercial Deicer

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Section 15: REGULATORY INFORMATION

INVENTORY LISTS

All of the components in this product are on the following inventory lists: USA (TSCA), Canada (DSL/NDSL); Europe (EINECS)

TSCA SECTION 12(b)

None of the chemicals in this product are listed under TSCA Section 12(b).

CERCLA HAZARDOUS SUBSTANCES

There is no CERCLA Reportable Quantity for this material.

SARA 311 CATEGORIES

Immediate (Acute) Health Hazard:	Yes
Delayed (Chronic) Health Hazard:	No
Fire Hazard:	No
Sudden Release of Pressure Hazard:	No
Reactivity Hazard:	No

SARA 313

None of the components in this product are subject to reporting under SARA Section 313.

CLEAN WATER ACT

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

STATE RIGHT-TO-KNOW:

This product does not contain components at levels which are required to be reported under the statutes of the following states: PA, MA, MN, and NJ.

This product does not contain materials known to the State of California (Proposition 65) to cause cancer and/or reproductive harm at levels which would require a warning under the statute.

NFPA 704	
Health	1
Fire	0
Physical Hazard	0
Hazard Rating 0-4 0-least hazardous; 4-most hazardous	

HMIS – Hazardous Materials Identification System	
Health	1
Fire	0
Physical Hazard	0
Hazard Rating: 0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe	



CRYOTECH CF7[®]

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Section 16: OTHER INFORMATION

SDS REVISION DATE

Revision date: June 30, 2014

Expiration date: June 30, 2017

Latest version of this SDS can be obtained from Cryotech.

NOTE TO EMPLOYER

This Safety Data Sheet contains environmental, health and toxicology information for your employees. Please ensure this information is provided to them. It also contains information to help you meet community right-to-know/emergency response reporting requirements under SARA Title III and many other laws. If you resell this product, this SDS must be given to the buyer or the information incorporated in your SDS. Discard any previous edition of this SDS.

DISCLAIMER

The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use or misuse are beyond our control, GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION dba Cryotech Deicing Technology makes no warranty, either express or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION dba Cryotech Deicing Technology assumes no responsibility for any injury or loss resulting from the use of the product described herein. User should satisfy himself that he has all current data relevant to his particular use.

End of Safety Data Sheet



Cryotech CF7[®] Liquid Commercial Deicer BRIX, Refractive Index, and Freezing Point Chart

Concentration (% weight)	Concentration (% by volume)	BRIX 20°C (68°F)	Refractive Index 20°C (68°F)	Freezing Point (°C)	Freezing Point (°F)
0	0.0	0.0	1.333	0.0	32.0
5	3.9	2.1	1.336	-0.5	31.0
10	8.0	4.2	1.339	-1.4	29.6
15	12.1	6.2	1.342	-2.4	27.7
20	16.3	8.2	1.345	-3.7	25.3
25	20.6	10.2	1.348	-5.3	22.4
30	25.1	12.2	1.351	-7.1	19.1
35	29.6	14.2	1.354	-9.2	15.4
40	34.2	16.1	1.357	-11.6	11.2
45	39.0	18.0	1.360	-14.2	6.5
50	43.8	19.9	1.363	-17.1	1.3
55	48.8	21.7	1.366	-20.2	-4.3
60	53.9	23.6	1.369	-23.6	-10.4
65	59.2	25.4	1.372	-27.2	-16.9
70	64.5	27.1	1.375	-31.1	-23.9
75	70.1	28.9	1.378	-35.2	-31.4
80	75.7	30.6	1.381	-39.6	-39.4
85	81.6	32.3	1.384	-44.3	-47.8
90	87.5	34.0	1.387	-49.2	-56.6
95	93.7	35.7	1.390	-54.4	-65.9
100	100.0	37.3	1.393	-59.9	-75.7

Technical Bulletin

Material Compatibility and Storage of Cryotech CF7® Liquid Commercial Deicer

Customers frequently ask if materials used in their storage, handling, and application equipment are compatible with potassium acetate commercial deicers. There are technical differences in the formulation of corrosion inhibitors and pH between potassium acetate deicers from various producers. Therefore, some differences in material compatibility are expected. This bulletin applies to Cryotech CF7, which is 50% potassium acetate by weight.

CORROSION INHIBITORS

CF7 contains less than 1% proprietary corrosion inhibitors. These inhibitors create a protective barrier on the surface of various metals. Their performance is tied to fluid pH which for CF7 is in the range of 10.5 to 11.5.

EQUIPMENT CONSIDERATIONS

The following guidelines should be considered when selecting equipment to transport, store, and apply CF7:

Pumps:

- Stainless steel positive displacement pumps or properly sized centrifugal pumps with mechanical seals are preferred, but not required.
- Avoid pump bodies made of brass, cast aluminum or cast iron, because some castings are poor quality and may result in reduced service life.
- Avoid large bore, low head (pressure) "trash" pumps.
- Avoid pumps with brass, zinc, or galvanized wetted parts.

Pipes:

- Stainless and carbon steel, PVC, polyethylene, and rubber is acceptable.
- Avoid galvanized metal piping and fittings because potassium acetate will react slowly with zinc giving off hydrogen gas.
- Pipe joints should be joined by welding or with compression fittings.
- Avoid threaded joints or use high quality pipe thread sealants.

Transfer Hoses:

- Wire-reinforced chemical hoses with cross-linked polyethylene lining and an EPDM rubber cover are recommended.
- Hoses should be rated for the system's pressure and vacuum.
- Stainless steel cam and groove fittings with locking cam levers and EPDM gaskets are also recommended.

Tanks:

- Shipping and storage in stainless steel, fiberglass, or polyethylene is preferred.
- Carbon and alloy steel tanks may be used if clean and rust free.
- Tanks must be strong enough to hold 10.68 pounds per gallon of CF7, which is 28% heavier than water.

Gaskets and Seals:

- Butyl rubber, ethylene propylene rubber (EPM, EPDM), isoprene, and natural rubber are preferred.
- Nitrile (Buna N), hypalon and neoprene rubber are generally acceptable.
- Avoid butadiene, fluorocarbon rubber, fluorosilicon, polyacrylate, polyurethane rubber, SBR rubber (Buna S), and silicon rubber.

Electrical Components:

- CF7 is an ionized solution and is more conductive than water. Users are advised to take precautions to prevent solutions containing CF7 from entering subsurface conduits and electrical components.

Technical Bulletin

Material Compatibility and Storage of Cryotech CF7® Liquid Commercial Deicer

Dispensing Equipment:

- External surfaces of equipment used to dispense CF7 should be routinely rinsed with warm water to prevent buildup of the fluid or other contaminants associated with winter operations. Additionally, a thorough washing with warm soapy water followed by thorough rinsing is recommended as equipment is removed from service after the deicing season.
- Diluted CF7 biodegrades naturally when exposed to air and other contaminants. This process quickens in warmer temperatures. Biodegradation can cause unsightly biological growth and superficial staining/corrosion. Frequent rinsings will prevent this.

MATERIAL COMPATIBILITY

Materials	Compatibility
Carbon Steel	Good
Alloy Steel	Good
Stainless Steel	Excellent
Brass	Poor - Not Recommended
Galvanized Metal	Poor - Do Not Use
Zinc	Poor - Do Not Use
Polyethylene (PE)	Excellent
Polybutylene	Excellent
Polyvinylchloride (PVC)	Excellent
Fiberglass	Excellent
Butyl Rubber	Excellent
Ethylene Propylene Rubber (EPM, EPDM)	Excellent
Isoprene	Excellent
Natural Rubber	Excellent
Nitrile (Buna N)	Good
Hypalon	Good
Neoprene Rubber	Good
Butadiene	Poor - Not Recommended
Fluorcarbon Rubber, (Viton)	Poor - Not Recommended
Fluorosilicon	Poor - Not Recommended
Polyacrylate Rubber	Poor - Not Recommended
Polyurethane Rubber/Elastomers	Poor - Not Recommended
SBR rubber (Buna S)	Poor - Not Recommended

Technical Bulletin

Material Compatibility and Storage of Cryotech CF7® Liquid Commercial Deicer

INSTALLATION CONSIDERATIONS

Obtain professional engineering assistance to ensure proper design and installation of tanks and components. Make certain the system has relief valves and low point drains, and that block valves can be opened without operator risk. Avoid dissimilar metals or provide properly engineered insulators to minimize the effect of galvanic corrosion. CF7 has low viscosity and low surface tension. Therefore, high quality joints are needed for a leak-free system. Welded or flanged pipe joints are recommended. But if threaded fittings are used, a high quality pipe sealant is important.

STORAGE CONSIDERATIONS

If requested, a non-persistent, environmentally friendly blue dye is added to CF7 to provide maintenance personnel with a visual indicator both in fluid storage and during application. This dye is specially formulated to dissipate after application and not cause staining of commonly used materials. It is water soluble, washable, and can be quickly removed with a weak bleach solution. Since the blue dye is not UV resistant, it will fade when exposed to sunlight. Therefore, when using a sight glass fluid level indicator, installation with a float or bobber will be helpful as the blue color may fade over time. In uncoated steel tanks, the dye color may gradually fade after one to two years in storage. As the dye fades, a color change to purple or pink may occur. To minimize the potential for the dye fading, totes should be stored indoors; however, if outside storage is necessary, totes should be covered with an opaque tarp. The dye does not otherwise affect the product. CF7 will perform effectively even if the dye has faded. However, if desired, additional liquid dye concentrate can be purchased from Cryotech.

Cryotech CF7 has an expected shelf life of at least three years when stored properly. Undiluted CF7 kept in closed totes and drums with minimal exposure to air does not degrade and may remain effective indefinitely. Diluted CF7 biodegrades naturally when exposed to air.

AVOID PROBLEMS

Do not use CF7 with galvanized (zinc-plated) metals.
Do not use any deicer including CF7 on poor quality concrete.
Do not mix CF7 with deicers from other manufacturers.

Technical Bulletin

Reactions Between Potassium Acetate Based Deicers and Zinc

This bulletin provides additional information about the reaction between zinc and Cryotech CF7®, potassium acetate-based liquid deicer.

SUMMARY

A slow reaction may occur when zinc is exposed to a potassium acetate-based deicer. The reaction results from prolonged contact and is not an issue during normal use.

ZINC REACTION

Hot-dipped galvanizing places a coating of zinc on the surface of steel. Brass alloys also contain zinc. Although zinc has excellent properties to resist corrosion from atmospheric conditions, it is a fairly reactive metal. As a result, potassium acetate-based deicers, like CF7, can cause a slow reaction in storage systems containing zinc. With prolonged exposure this reaction may cause hydrogen gas to form and zinc to discolor and dissolve.

STORING CF7

Therefore, CF7 should not be stored or plumbed through systems that use galvanized, zinc, or brass components.

FIELD USE

For a number of reasons there is seldom a reaction between potassium acetate and zinc coatings during application.

- Exposure is limited to short intervals.
- Precipitation causes the deicer to dilute.
- Corrosion reactions occur slowly at cold temperatures when deicers are applied.
- Even at low temperatures CF7 biodegrades within a few days.

Experience at the Zilwaukee Bridge near Saginaw, Michigan, where CF7 has been used for years, supports the conclusion that little to no reaction occurs between CF7 and galvanized materials during deicing operations. The bridge is essentially corrosion-free.

CONCLUSION

Do not use galvanized, zinc, or brass tanks or piping for long-term storage of CF7. The exterior surfaces of application equipment should be routinely washed with warm soapy water.

Technical Bulletin

Proper Use of Cryotech CF7 and NAAC

Customers frequently ask how to properly use deicing chemicals when dealing with snow, freezing rain, and ice.

Liquid CF7® (potassium acetate) is generally used as an anti-icer to prevent snow and ice from bonding to the surface. The snow and ice can then be easily removed by broom or plow. Solid NAAC® (sodium acetate) is used as a deicer. It is also applied early in the storm but its purpose is to melt through an existing pack and break ice-to-pavement bonds prior to mechanical removal.

CF7 is more efficient than a solid deicer when applied as an anti-icer because it takes less energy to prevent surface bonding than to break existing bonds. Therefore, early liquid application followed by mechanical removal of snow and ice accumulation provides the best and most efficient method for combating winter storms.

"Early application" means applying just before the event or as precipitation begins to fall. CF7 rates range from 0.5-1.5 gallons per thousand square feet (25-75 grams per square meter) depending on weather conditions.

It is also important to evenly apply the fluid using low-pressure, large droplet nozzles. Surfaces can then be cleaned mechanically until bonds reform and dilution requires additional applications.

How long will it last? CF7 dilution from water generated by melt raises the solution freeze point. At some level of dilution it becomes ineffective. Other conditions such as air and surface temperatures, type and amount of precipitation, and deicer application rate also affect how long liquid deicers will last. The clearest signals that dilution has occurred are low friction and unsatisfactory snow or ice patches remaining after mechanical removal. Dilution can also be determined by computer monitored roadway sensors. Re-application is necessary when dilution occurs.

Solid NAAC is generally applied as a deicer on top of pack, but always early in the storm when possible. Pack results from surface bonding of snow and ice and is difficult to remove with liquid deicers. It is common for pack to build on roadways as well as on secondary areas like ramps that may not receive anti-icing treatments.

NAAC is applied on the wet area, ice, or pack. As it combines with moisture, NAAC changes from a solid to a liquid. This exothermic phase change – unique to NAAC – releases heat allowing each pellet to quickly penetrate the pack and break surface bonds. Application rates range from 5-15 pounds per thousand square feet (25-75 grams per square meter).

Here again, it is important to achieve even application. Because NAAC is produced as spherical pellets it spreads more evenly than flaked products. Spherical pellets are also more effective because they penetrate faster and deeper than flakes, which tend to dilute and refreeze.

In certain conditions, CF7 may be used with NAAC to assist with breaking up heavy pack. After holes are formed by NAAC, CF7 is applied over the top and thereby has a direct route to the pavement surface. This dual application speeds the deicing process.

CF7 is also recommended as a prewetting agent for NAAC to jump-start its phase change. This prewet also causes the solid to stick to the surface, minimizing product loss from wind and vehicle movements. During freezing rain, NAAC may be helpful when applied with CF7. This dual application extends operations by minimizing dilution of the liquid.

NAAC and CF7 should not be combined during routine anti-icing operations. CF7 is more efficient and the addition of NAAC is generally not helpful. The exception is use in the aforementioned freezing rain condition.

Technical assistance and on-site training are available by calling Cryotech at (800)346-7237.



Toxicity of Acetate-Based Deicers in Marine (Saltwater) Environments

Toxicity of deicers to marine organisms can be important to know when deicing applications are located where run-off can flow into saltwater environments. Cryotech acetate-based solid and liquid deicers are all considered relatively harmless in this type of receiving water.

CF7 Acute Toxicity Testing Results **Cryotech potassium acetate deicer for use on roads and bridges**

48-hr LC50, sheepshead minnows:	6,300 milligrams per liter (mg/L)
48-hr LC50, mysid:	1,400 mg/L

The US Fish and Wildlife Service Toxicity rating scale defines a chemical as “relatively harmless” when acute toxicity results are above 1000 milligrams per liter.

E36 Acute Toxicity Testing Results **Cryotech potassium acetate runway deicer**

48-hr LC50, sheepshead minnows:	6,300 mg/L
48-hr LC50, mysid:	1,400 mg/L

The US Fish and Wildlife Service Toxicity rating scale defines a chemical as “relatively harmless” when acute toxicity results are above 1000 milligrams per liter.

NAAC Acute Toxicity Testing Results **Cryotech anhydrous sodium acetate deicer for use on roads, bridges, and runways**

48-hr LC50, sheepshead minnows:	>8000 mg/L
48-hr LC50, mysid:	~8000 mg/L

The US Fish and Wildlife Service Toxicity rating scale defines a chemical as “relatively harmless” when acute toxicity results are above 1000 milligrams per liter.

Chronic Toxicity Testing:

It is generally agreed by state agencies that acetate-based deicers are readily biodegradable and dissipate rapidly. The chance of chronic long-term exposure is therefore greatly reduced. Given that and the fact that Cryotech acetate-based deicers are relatively harmless, chronic toxicity testing has not been required.

Notes:

This independent laboratory test data was generated using EPA recognized test protocols and deicer formulations provided by Cryotech.

EPA/600/4-90/027F: Method for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms; EPA/600/4-91/002: Short Term Methods of Estimating Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms and; EPA/600/4-91/003: Short Term Methods of Estimating Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms.



Guidance on Moving Ahead for Progress in the 21st Century (MAP-21) Act

Non-chloride based Calcium Magnesium Acetate (Cryotech CMA[®]), Sodium Acetate (Cryotech NAAC[®]), and Potassium Acetate (Cryotech CF7[®]) deicers are eligible for matching Federal Funds under the MAP-21 act signed into law in July 2012. Through the MAP-21 act, funds are available for low corrosive anti-icing/deicing applications and environmentally preferred anti-icers/deicers used on highway bridges through 2014. MAP-21 builds on the foundation established by Federal highway and surface transportation acts for over a decade, which make federal funds available for the use of such safer deicers to help preserve and rehabilitate America's bridges.

TITLE I—FEDERAL-AID HIGHWAYS **Subtitle A—Authorization and Programs**

SEC. 1101. AUTHORIZATION OF APPROPRIATIONS.

(a) In General.—The following sums are authorized to be appropriated out of the Highway Trust Fund (other than the Mass Transit Account):

(1) Federal-Aid Highway Program.—For the national highway performance program under section 119 of title 23, United States Code, the surface transportation program under section 133 of that title, the highway safety improvement program under section 148 of that title, the congestion mitigation and air quality improvement program under section 149 of that title, and to carry out section 134 of that title—

(A) \$37,476,819,674 for fiscal year 2013; and

(B) \$37,798,000,000 for fiscal year 2014.

[. .]

SEC. 1108 . SURFACE TRANSPORTATION PROGRAM

Title 23, United States Code § 133(b) amended to read as follows:

(b) Eligible Projects.— A State may obligate funds apportioned to it under section 104(b)(2) for the surface transportation program only for the following:

(1) Construction, reconstruction, rehabilitation, resurfacing, restoration, preservation, or operational improvements for highways, including construction of designated routes of the Appalachian development highway system and local access roads under section 14501 of title 40.

(2) Replacement (including replacement with fill material), rehabilitation, preservation, protection (including painting, scour countermeasures, seismic retrofits, impact protection measures, security countermeasures, and protection against extreme events) and application of calcium magnesium acetate, sodium acetate/formate, or other environmentally acceptable, minimally corrosive anti-icing and deicing compositions for bridges (and approaches to bridges and other elevated structures) and tunnels on public roads of all functional classifications, including any such construction or reconstruction necessary to accommodate other transportation modes.

[. .]

Additional information can be found at <http://www.fhwa.dot.gov/map21/>



CRYOTECH CF7® LIQUID COMMERCIAL DEICER TRAINING AGENDA

To: CF7 Customers

From: Tony Myhra, Product Manager

Subject: **CF7 Training Agenda** – using slides and video

Complimentary training offered after award of a contract or blanket p.o.

Schedule - based on Product Manager availability and needs of customer

5 minutes -	CF7 introduction History Product specifications
30 minutes -	CF7 application Rates Timing Methods of application for various storm conditions When to re-apply Review actual storm situations
15 minutes -	CF7 handling safety MSDS Care of equipment Environmental
10 minutes -	Wrap-up Review Question and answer period



**CRYOTECH CF7® LIQUID COMMERCIAL DEICER (the “Product”)
WARRANTY**

Cryotech Deicing Technology warrants that the product to be delivered hereunder shall conform to the specifications attached hereto; and upon receipt of payment therefore, shall be free from any security interest or encumbrance. Cryotech **disclaims** all warranties and conditions, either express or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose. In no event shall Cryotech be liable to the Buyer or to any third party for any indirect, incidental, special, consequential, punitive, or exemplary damages (including without limitation lost profits, lost savings, or loss of business opportunity) arising out of or relating to the deicer, or the use or inability to use the same, even if Cryotech has been advised of the possibility of such damages.



PACIFIC NORTHWEST SNOWFIGHTERS (PNS) APPROVED PRODUCTS

Non-chloride Calcium Magnesium Acetate (Cryotech CMA®), Potassium Acetate (Cryotech CF7®), and Liquid CMA (A 25% mixture of Cryotech CMA® and potable water) are located on the Pacific Northwest Snowfighters (PNS) Association's approved product list. The transportation agencies of Washington, Oregon, Montana, Idaho, and the province of British Columbia formed PNS several years ago to outline specifications for deicing chemicals.

For more information regarding the PNS Association, please visit:

<http://pnsassociation.org>

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CRYOTECH CF7® CUSTOMER REFERENCES

Cryotech CF7® Liquid Commercial Deicer is used by numerous highway departments and/or cities with CF7 for FAST systems and also for direct application. The following list includes a sample of customers who have purchased CF7 (Potassium Acetate):

Customer	Contact	Telephone	E-mail
MN DOT-Detroit Lake	Ralph Berglund	218-846-3651	Ralph.berglund@state.mn.us
ND DOT-Bismarck	Troy Gilbertson	701-239-8900	tgilbert@nd.us
Utah DOT-Provo Canyon	Niel Lundell	801-368-8312	Sta3425@utah.gov

Do not hesitate to contact Cryotech or any of the above customers with questions.



**CRYOTECH CF7[®], CRYOTECH E36[®] LAVATORY ANTIFREEZE, AND
CRYOTECH E36[®] LIQUID DEICING CHEMICALS**

Cryotech CF7[®] and Cryotech E36[®] Lavatory Antifreeze are materially the same chemistry as Cryotech E36[®] – 50% potassium acetate solution plus a proprietary inhibitor package. CF7 is sold to commercial and government markets for use on roads, bridges, parking garages, sidewalks, etc., E36 Lavatory Antifreeze is sold for use in aircraft lavatory systems, and E36 is sold to airports and military bases for use on runways and ramps.

E36 is certified to AMS 1435 for runway use; CF7 is not. Any test data that references E36 is also applicable to CF7 and E36 Lavatory Antifreeze. However, because they are used for different applications, usage rates, labels, product data, and training information are different for each product. For further information or questions, please contact Cryotech at (800)346-7237 or (319)372-6012.

CRYOTECH CMA[®]

Solid Commercial Deicer



BENEFITS

- Less corrosive than tap water
- Safest deicer for concrete
- Eliminates chloride corrosion, chloride free
- Can be used on new concrete (dependent on quality), cured for at least 30 days
- Readily biodegradable, low toxicity
- Safer for pets than sodium chloride
- Requires fewer applications than other common deicers
- Applies easily, can be used straight, mixed with salt or sand, and as a liquid
- Manufactured as a round pellet to be less dusty than irregularly shaped deicers
- Complimentary customer training upon request

PERFORMANCE

- Patented Unipel technology ensures uniform size, shape, and composition of each pellet
- Works best above 20°F (-7°C)
- Contains pure materials for long lasting effects, better than chloride salts
- Breaks/inhibits bond between snow/ice and pavement making snow/ice easier to remove
- Creates brine and a dry, oatmeal-like consistency with snow for improved traction

ENVIRONMENT

- Safe for vegetation
- Low toxicity to aquatic species
- Increases soil permeability, calcium and magnesium are soil amendments
- Acetate biodegrades to carbon dioxide water
- Minimal mobility in soil, unlikely to reach groundwater
- Does not contain nitrogen or chlorides

APPLICATION

- Apply early in the storm to prevent snow/ice bonding
- First application:
 - Commercial = 15-20 lbs/1000ft² (75-100 g/m²)
 - Highway = 300-400 lbs/lane mile (20-40 g/m²)
- Allow time for CMA to penetrate and loosen the snow/ice pack before removing snow/ice
- Re-apply when new snow/ice accumulation shows first tendency to bond

HANDLING

- Store in original container
- Avoid excess moisture which may cause caking
- Preserve pellet integrity by not overhandling

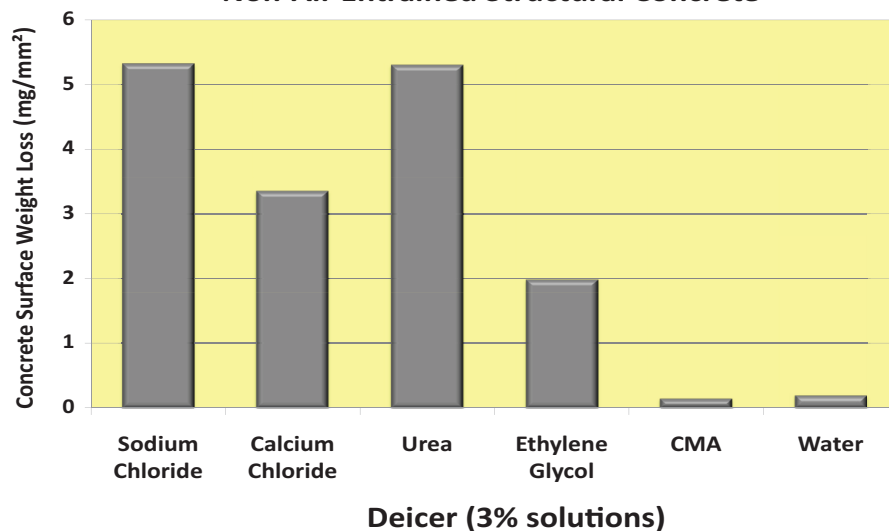
See Reverse Side For Product Specifications
Test Data Available Upon Request
ISO 9001:2008 & 14001:2004 CERTIFIED COMPANY



PRODUCT SPECIFICATIONS - CRYOTECH CMA®

COMPOSITION	Calcium Magnesium Acetate (CMA) 3:7 Ca to Mg molar ratio Hydrated CMA + other acetates Inert Material	96% minimum 4% maximum
APPEARANCE	White to off-white spherical pellet	
BULK DENSITY	40 lbs/ft ³ to 44 lbs/ft ³ (0.65 g/cm ³ to 0.79 g/cm ³)	
PARTICLE SIZE	<u>Sieve</u> 4 14	<u>Particle Passing</u> 90 10
RESIDUAL BASE	Maximum of 0.4 meq base/g	
TYPICAL pH	8 to 10 in a 10% solution	
PACKAGING	55 lbs (25 kg) poly bags - 40 bag minimum 2205 lbs (1000 kg) Super Sacks - 1 super sack minimum Bulk - 20 metric ton minimum	

**Spalling Effect of Deicers on
Non-Air Entrained Structural Concrete**



Department of Transportation, UK 1993



TO ORDER OR FOR PRODUCT INFORMATION CONTACT:

Ph: +1 319.372.6012 or +1 800.346.7237 Fax: +1 319.372.2662

E-mail: deicers@cryotech.com

Cryotech Deicing Technology . 6103 Orthoway . Fort Madison, IA . 52627
WWW.CRYOTECH.COM



ISO 14001
EMS 89384



ISO 9001
FM 39092

Form #MKT400 Rev. 08/03/2015



CRYOTECH CMA[®]

Solid Commercial Deicer

Safety Data Sheet

Section 1: IDENTIFICATION

PRODUCT IDENTIFIER

CRYOTECH CMA[®]

Solid Commercial Deicer

RECOMMENDED USE OF CHEMICAL AND RESTRICTIONS ON USE

Deicing/anti-icing highways, bridges, parking lots, and other pavements.

DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Name/Address: Cryotech Deicing Technology
6103 Orthoway
Fort Madison, IA 52627
United States

Contact Information: Telephone: (800) 346-7237
Fax: (319) 372-2662
Email: deicers@cryotech.com
Website: www.cryotech.com

EMERGENCY TELEPHONE NUMBER

CHEMTREC (800) 424-9300
Outside continental USA (703) 527-3887

Section 2: HAZARD(S) IDENTIFICATION

CLASSIFICATION ACCORDING TO OSHA HAZCOM 2012

Hazard Class Not classified as hazardous

LABEL ELEMENTS ACCORDING TO OSHA HAZCOM 2012

There are no OSHA required label elements for this product.

CLASSIFICATION ACCORDING TO WHMIS (Canada)

Hazard Class Not controlled

WHMIS Hazard Symbols Not applicable

WHMIS Signal Word Not applicable

POTENTIAL HEALTH EFFECTS

Eye Contact May cause temporary eye irritation. Corneal injury is unlikely.

Skin Contact Repeated contact may cause slight skin irritation or dry skin.

Inhalation May cause irritation or coughing.

Ingestion Ingestion of large quantities may cause nausea, vomiting, diarrhea and abdominal discomfort.

Effects of repeated exposure No effects other than described above are expected.

Effects of repeated exposure No effects other than described above are expected.



CRYOTECH CMA[®]

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Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

MIXTURES

Ingredient	CAS No	Wt. %
Hydrated Calcium Magnesium and other acetates	76123-46-1	96
Moisture and water insoluble oxides/hydroxides		<4

Section 4: FIRST- AID MEASURES

DESCRIPTION OF FIRST AID MEASURE

Eye	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. If irritation persists, seek medical attention.
Skin	As a precaution, wash skin thoroughly with soap and water. Remove and wash contaminated clothing.
Inhalation	If inhaled, remove to fresh air and get medical advice
Ingestion	If swallowed, give milk or water to drink and telephone for medical advice. Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

MOST IMPORTANT SYMPTOMS / EFFECTS

Eye	May cause eye irritation. Symptoms may include temporary discomfort or pain, excess blinking and tear production, with possible redness and swelling.
Skin	May cause itching or irritation of any cut or abraded skin. Symptoms of prolonged contact may include dry skin.
Inhalation	Inhalation of dust during handling may cause respiratory tract irritation and coughing.
Ingestion	Ingestion of large quantities may cause nausea, vomiting, diarrhea and abdominal discomfort.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT

Specific treatments	If you feel unwell, seek medical advice immediately. Show the label or safety data sheet to medical personnel if possible.
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CRYOTECH CMA[®]

Solid Commercial Deicer

Safety Data Sheet

Section 5: FIRE FIGHTING MEASURES

FLAMMABILITY

Flash Point (close cup)	Nonflammable by OSHA/WHMIS criteria
Auto Ignition	Not applicable

EXTINGUISHING MEDIA

Suitable Extinguishing Media	Water, carbon dioxide, or dry chemical. Use extinguishing media appropriate for surrounding materials.
Unsuitable Extinguishing Media	Not applicable

SPECIAL HAZARDS

Hazardous Combustion Products	Normal combustion forms carbon dioxide and water.
Explosion Limits	Data not available. Not considered to be an explosion hazard.
Unusual Fire Hazards	None expected

SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS

Special Protective Equipment for Firefighters	Wear NIOSH approved self-contained breathing apparatus (SCBA) with positive air pressure.
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Section 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT, AND EMERGENCY PROCEDURES

Avoid eye/skin contact with spilled material. Refer to Section 7 for additional handling precautions

Methods for Containment	If material is dissolved, contain and/or absorb spill with inert material (e.g. sawdust, sand, vermiculite).
Methods for Cleaning-Up	Scoop up material and transfer to disposal container. If needed, wash spillage area with plenty of water.

Section 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING

Handling	Avoid eye contact. Avoid breathing dust when handling.
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PRECAUTIONS FOR SAFE STORAGE, INCLUDING ANY COMPATIBILITIES

Storage	Store in tightly sealed original containers, away from direct heat and strong oxidizing agents. Do not store or handle product in systems constructed of wetted parts consisting of galvanized steel, zinc, or brass components.
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CRYOTECH CMA[®]

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Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

TWA PEL:

No specific limits have been established for this product. As a guideline, OSHA (United States) has established the following limits which are generally recognized for inert or nuisance dust. Particulates Not Otherwise Regulated (PNOR): 8-hr TWA limits of 15 mg/m³ (total particulate) and 5 mg/m³ (respirable fraction).

TWA TLV:

No specific limits have been established for this product. As a guideline, ACGIH (United States) has established the following limits which are generally recognized for inert or nuisance dust. Particulates (insoluble) Not Otherwise Classified (PNOC): 8-hr TWA limits of 10 mg/m³ (as total dust) and 3 mg/m³ (as respirable).

EXPOSURE CONTROLS

Engineering Controls

No special ventilation is usually necessary; however if operating conditions create high concentrations of this material, special ventilation may be needed to keep exposure to airborne contaminants below the exposure limit.

INDIVIDUAL PROTECTIVE MEASURES/PERSONAL PROTECTIVE EQUIPMENT

Eye Protection

Safety glasses or goggles are recommended if eye exposure to product or dust is possible.

Skin Protection

Chemical-resistant gloves and clothing should be used if prolonged exposure is possible to prevent drying of skin.

Respiratory Protection

Breathing of dust should be avoided. If operating conditions create high airborne concentrations of this material, the use of an approved respirator is recommended.



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Section 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	White to off-white spherical pellet
ODOR	Odorless to slight vinegar odor
ODOR THRESHOLD	No data available
pH (20°C, 68°F)	8-10 (10% aqueous solution)
MELTING POINT	Decomposes
BOILING POINT	Not applicable
FLASH POINT	Not applicable
EVAPORATION RATE	No data available
FLAMMABILITY/EXPLOSION LIMITS	Not applicable
VAPOR PRESSURE (20°C)	Not applicable
VAPOR DENSITY (AIR = 1)	Not applicable
RELATIVE DENSITY	No data available
SOLUBILITY IN WATER	Partially soluble
PARTITION COEFFICIENT; n-OCTANOL/WATER	No data available
AUTO-IGNITION TEMPERATURE	No data available
DECOMPOSITION TEMPERATURE	No data available
VISCOSITY (20°C)	Not applicable
OXIDIZING PROPERTIES	Not oxidizing
EXPLOSIVE PROPERTIES	Not explosive

Section 10: STABILITY AND REACTIVITY

REACTIVITY

No dangerous reactions known under conditions of normal use.

CHEMICAL STABILITY

Stable. Polymerization will not occur.

POSSIBILITY OF HAZARDOUS REACTIONS

No dangerous reactions known under conditions of normal use.

CONDITIONS TO AVOID

Avoid prolonged contact with reactive metals such as magnesium and zinc, especially in closed systems where hydrogen gas from the oxidation of these materials may accumulate over time.

INCOMPATIBLE MATERIALS

Strong oxidizing agents; strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

May decompose into oxides of carbon.



CRYOTECH CMA[®]

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Section 11: TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

LD50 rat-oral: 3000 mg/kg

LC50 rat-inhalation: >5000 mg/m³

LD50 rat-dermal: >5000 mg/kg

Dermal irritation rabbit: Non-irritating

Ocular irritation rabbit: Moderate redness/discharge and some swelling of iris at 1 hr.; insignificant signs of irritation at 24 hr.; all signs cleared at 72 hr.

Sub-chronic oral: No effects after 28 consecutive days dosing at 1000 mg/kg/day.

LIKELY ROUTES OF EXPOSURE

Skin contact, eye contact, ingestion.

SYMPTOMS RELATED TO THE PHYSICAL, CHEMICAL, AND TOXICOLOGICAL CHARACTERISTICS

Eye	May cause eye irritation. Symptoms may include temporary discomfort or pain, excess blinking and tear production, with possible redness and swelling.
Skin	May cause itching or irritation of any cut or abraded skin. Symptoms of prolonged contact may include dry skin.
Inhalation	Inhalation of dust during handling may cause respiratory tract irritation and coughing. This product is not otherwise expected to be an inhalation hazard.
Ingestion	Ingestion of large quantities may cause nausea, vomiting, diarrhea and abdominal discomfort.

DELAYED AND IMMEDIATE EFFECTS AND CHRONIC EFFECTS FROM SHORT- AND LONG-TERM EXPOSURE/NUMERICAL MEASURES OF TOXICITY

Skin Corrosion/Irritation	Based on available data, the classification criteria are not met.
Serious Eye Damage/Irritation	Based on available data, the classification criteria are not met.
Respiratory or Skin Sensitization	Based on available data, the classification criteria are not met.
Germ Cell Mutagenicity	Based on available data, the classification criteria are not met.
Carcinogenicity	This product does not contain any ingredients that are considered to be carcinogens by IARC, NTP, or OSHA.
Reproductive Toxicity	Based on available data, the classification criteria are not met.
STOT-Single Exposure	Based on available data, the classification criteria are not met.
STOT-Repeated Exposure	Based on available data, the classification criteria are not met.
Aspiration Hazard	Based on available data, the classification criteria are not met.

Section 12: ECOLOGICAL INFORMATION

ECOTOXICITY (AQUATIC AND TERRESTRIAL)

Not expected to cause long-term adverse effects in the aquatic or terrestrial environments.

PERSISTENCE AND DEGRADABILITY

Readily biodegradable. COD (TOD): 0.75 g O₂/g deicer; BOD₂₀ (2°C): 0.40 g O₂/g deicer, BOD₂₀ (10°C): 0.67

BIOACCUMULATIVE POTENTIAL

Bioaccumulation is not expected.



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MOBILITY IN SOIL

Adverse effects not expected.

OTHER ADVERSE EFFECTS

None expected.

Section 13: DISPOSAL CONSIDERATIONS

WASTE TREATMENT AND METHODS OF DISPOSAL

Based on available information, this product is neither listed as a hazardous waste nor does it exhibit any of the characteristics that would cause it to be classified as a characterized hazardous waste under RCRA. This product may be absorbed onto suitable materials and disposed of in a sanitary landfill unless local, state, or provincial regulations prohibit such disposal.

Section 14: TRANSPORT INFORMATION

TRANSPORT INFORMATION

Not regulated as dangerous goods per US DOT or IATA.

Section 15: REGULATORY INFORMATION

INVENTORY LISTS

All of the components in this product are on the following inventory lists: USA (TSCA), Canada (DSL/NDL); Europe (EINECS)

TSCA SECTION 12(b)

None of the chemicals in this product are listed under TSCA Section 12(b).

CERCLA HAZARDOUS SUBSTANCES

There is no CERCLA Reportable Quantity for this material.

SARA 311 CATEGORIES

Immediate (Acute) Health Hazard:	Yes
Delayed (Chronic) Health Hazard:	No
Fire Hazard:	No
Sudden Release of Pressure Hazard:	No
Reactivity Hazard:	No

SARA 313

None of the components in this product are subject to reporting under SARA Section 313.

CLEAN WATER ACT

None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.



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STATE RIGHT-TO-KNOW:

This product does not contain components at levels which are required to be reported under the statutes of the following states: PA, MA, MN, and NJ.

This product does not contain materials known to the State of California (Proposition 65) to cause cancer and/or reproductive harm at levels which would require a warning under the statute.

NFPA 704	
Health	1
Fire	0
Physical Hazard	0
Hazard Rating 0-4 0-least hazardous; 4-most hazardous	

HMIS – Hazardous Materials Identification System	
Health	1
Fire	0
Physical Hazard	0
Hazard Rating: 0 = minimal, 1 = slight, 2 = moderate, 3 = serious, 4 = severe	

Section 16: OTHER INFORMATION

SDS REVISION DATE

Revision date: May 29, 2015

Expiration date: May 29, 2018

Latest version of this SDS can be obtained from Cryotech.

NOTE TO EMPLOYER

This Safety Data Sheet contains environmental, health and toxicology information for your employees. Please ensure this information is provided to them. It also contains information to help you meet community right-to-know/emergency response reporting requirements under SARA Title III and many other laws. If you resell this product, this SDS must be given to the buyer or the information incorporated in your SDS. Discard any previous edition of this SDS.

DISCLAIMER

The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use or misuse are beyond our control, GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION dba Cryotech Deicing Technology makes no warranty, either express or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION dba Cryotech Deicing Technology assumes no responsibility for any injury or loss resulting from the use of the product described herein. User should satisfy himself that he has all current data relevant to his particular use.

End of Safety Data Sheet



Publication No. FHWA-RD-96-178

March 1997

Impedance Spectroscopy for the Evaluation of Corrosion Inhibitors in Highway Deicers

Research and Development

Turner-Fairbank Highway Research Center

6300 Georgetown Pike

McLean, Virginia 22101-2296

Technical Report Documentation Page

1. Report No. FHWA-RD-96-178		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle IMPEDANCE SPECTROSCOPY FOR THE EVALUATION OF CORROSION INHIBITORS IN HIGHWAY DEICERS				5. Report Date March 1997	
				6. Performing Organization Code	
7. Author(s) Ugo Bertocci				8. Performing Organization Report No.	
9. Performing Organization Name and Address Office of Engineering R & D Federal Highway Administration 6300 Georgetown Pike McLean, VA 22101-2296				10. Work Unit No. (TRAIS) 3E4b0142	
				11. Contract or Grant No. NAS/NRC RA Project Na 27.01.00.04	
12. Sponsoring Agency Name and Address Office of Engineering R & D Federal Highway Administration 6300 Georgetown Pike McLean, VA 22101-2296				13. Type of Report and Period Covered Final Report February 1992 – July 1994	
				14. Sponsoring Agency Code	
15. Supplementary Notes This work was performed while the author held a National Research Council/FHWA Research Associateship. The FHWA Research Advisor was John W. Peart. FHWA Contact: Robert A. Kogler					
16. Abstract Electrochemical impedance spectroscopy {EIS} measurements were carried out on steel bars embedded in concrete blocks that were immersed in aqueous solutions of commercial deicing salts, many of which had corrosion inhibitors added. The effectiveness of the inhibitors was assessed by monitoring the evolution of the EIS results for a period of 11 months. EIS was supplemented with open circuit potential and polarization measurements. From the results, a semiquantitative ranking of the commercial deicers tested as to their corrosivity could be derived.					
17. Key Word Electrochemical impedance spectroscopy corrosivity, corrosion inhibitors, deicers, sodium chloride, calcium magnesium acetate, rebar corrosion.				18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161.	
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				22. Price	

TECHNICAL SUMMARY

IMPEDANCE SPECTROSCOPY FOR THE EVALUATION OF CORROSION INHIBITORS IN HIGHWAY DEICERS

Purpose

The purpose of this work was, on the one side, to see if the addition of corrosion inhibitors to commercial deicing mixtures, which contain mainly chloride salts, can be shown to affect the corrosion behavior of steel in concrete. On the other, it was to evaluate the usefulness of electrochemical impedance spectroscopy (EIS) to obtain information on the corrosion of steel in concrete under fairly realistic conditions.

In order to simulate the conditions which are encountered in the field the measurements were carried out on steel rods embedded in concrete, exposed by immersions to solutions of various inhibitor-containing deicers. The measurements were taken over a period of 11 months, enabling one to have a picture of the progress of the corrosion process and to see whether or not corrosion was accelerating with time.

Materials tested

The six deicers tested (numbered from 1 to 6) were commercial products, so that their exact composition and exact nature of their inhibitors are not known. Two of the deicers were in liquid form, presumably because of the chloride salt in mainly MgCl_2 , while the others contained mainly NaCl . Another deicer tested was a mixture of magnesium and calcium acetates, generally known as CMA. For comparison, a NaCl solution without inhibitors was also tested.

Experimental procedures

The samples employed in the measurements consisted of concrete cylinders, 5 cm in diameter and 12.7 cm in length, in which four rods of A36 steel, 0.635 cm in diameter and 11.4 cm in length, were embedded in a square pattern. About 2.5 cm of the rods extended outside the upper end of the concrete cast. These samples were immersed in deicer containing solutions routinely on Mondays and taken out on Fridays, in order to ensure access to oxygen during the week-end drying periods. All chloride-containing solutions had a chloride concentration of 0.2 M.

Most of the EIS measurements were performed at the open circuit potential E_{∞} . The frequency range of the EIS measurements was pushed as much as possible toward the low frequencies, routinely to 0.5 mHz. To supplement the information provided by EIS, open circuit potential E_{∞} and polarization measurements were also performed. From the EIS data, the value of the corrosion resistance was obtained by fitting the results to an equivalent electrical circuit. The corrosion rate was then calculated with the aid of the results of the polarization measurements.

Composition of the solutions used in the measurements

	Main Constituents	Form	Concentration	Inhibitor	pH of Solution
1	NaCL	solid	13g/L	Mg phosphate	7.0
2	MgCl ₂	liquid	30g/L	citrate	9.3
3	NaCl	solid	13g/L	unknown	6.1
4	NaCl 83% MgCl ₂ 10%	solid	13g/L	PCI TM	6.8
5	MgCl ₂	liquid	35g/L	PCI TM	6.0
6	Ca(Ac) ₂ 30% + Mg(Ac) ₂ 70%	solid	100g/L	none	9.7
7	NaCl	solid	12 g/L	none	6.8

Conclusions

The tests carried out have shown that EIS can be employed for the long term study of corrosion in reinforced concrete, and can be used for ranking the deicer formulations as to their corrosion effects. Since the tests were carried out not on bare steel electrodes, but on rods embedded in concrete, the time required for obtaining meaningful results is quite long. This report describes about one year of tests, and yet in some cases it appears that a longer exposure would have been desirable in order to obtain more clear cut results. On the other hand, the data collected should be more reliable than tests on bare metal, because they probe the ability of the various inhibitors to penetrate the concrete, as well as the capability to counteract the deleterious effects of chloride salts which have already diffused into the material.

In the conditions employed in this study, a good correlation has been found between open circuit potential E_{∞} and corrosion resistance, and by implication corrosion rate. This correlation has been observed by many workers, and has lead to the suggestion that a simple and inexpensive way to monitor the corrosion conditions of steel in reinforced concrete is that of measuring E_{∞} . However, it should be kept in mind that the correlation is largely of statistical nature, and there is a substantial scatter in the points, which might entail an uncertainty of more than one order of magnitude in corrosion rate for the same value of the potential.

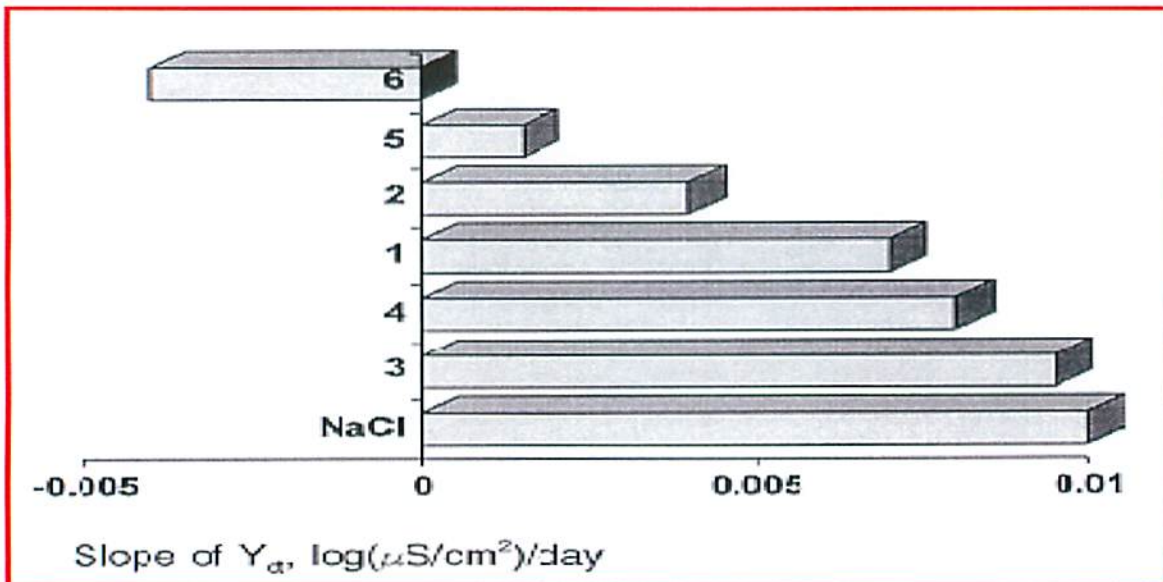
For a ranking of the six deicers, from the least to the most corrosive, one can choose the charge transfer admittance $Y_{ct} = 1/R_{ct}$ which is proportional to the corrosion rate, plotting its logarithm versus time and calculating a linear least-squares fit. The higher the slope of the straight line, the greater the corrosion rate becomes, indicating a failure to protect the steel on the part of the inhibitor. The resulting ranking is shown in the following list:

1. Solution #6 CMA
2. Solution #5
3. Solution #2
4. Solution #1 and #4

5. Solution #3 and #7 NaCl

The ranking can be presented graphically also, taking a semiquantitative aspect, as shown in the figure.

One should not, however, attach too much meaning to small differences in the numerical value of the slopes. Therefore it is doubtful that deicers #1 and #4 behave significantly better than plain road salt, #7. CMA (#6) is clearly superior to all others, but deicers #5 and to much more limited extend, deicer #2 have shown to be able to slow down corrosion.



Researcher – This study was performed by Dr. Ugo Bertocci while sponsored by FHWA/NRC under the cooperative Research Associateship program.

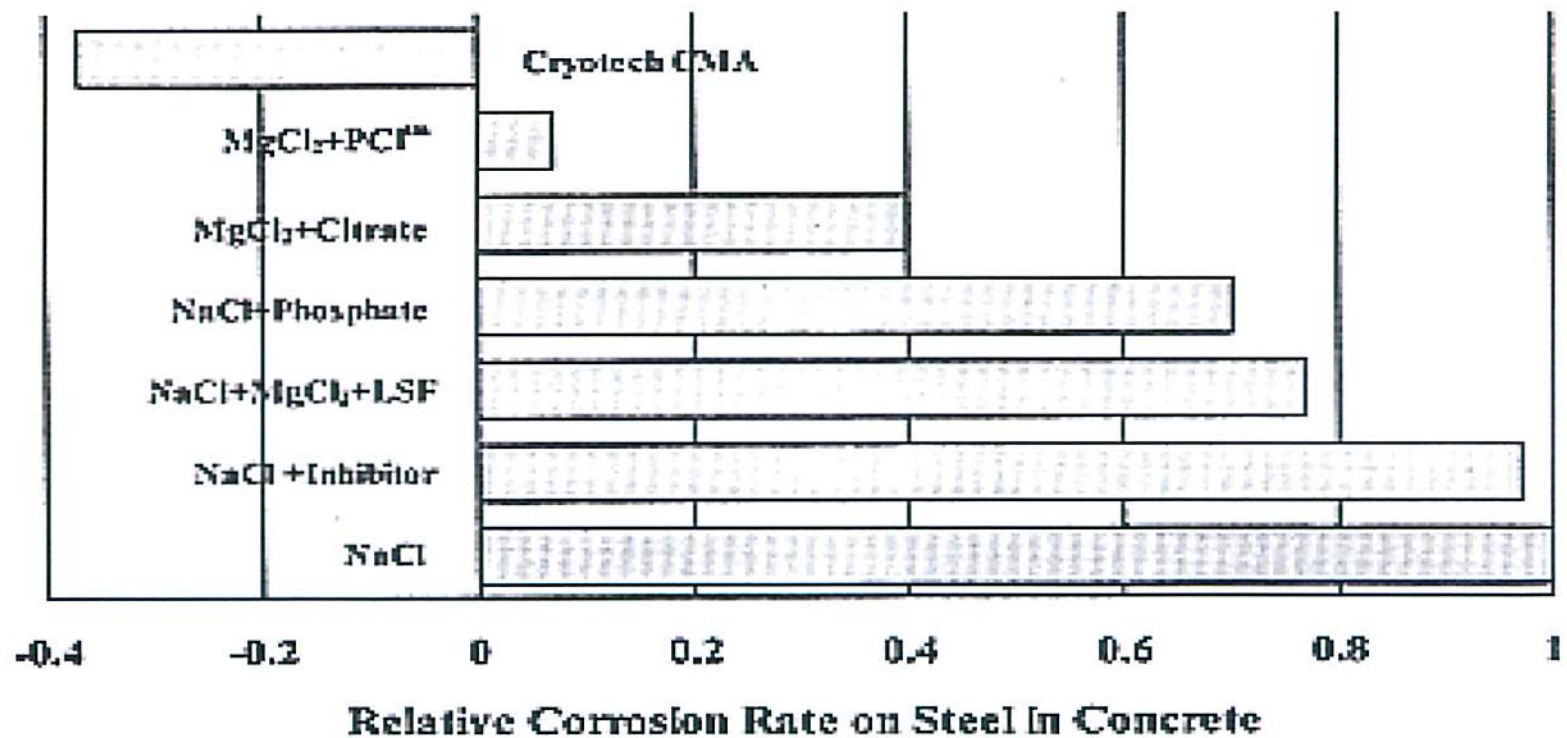
Distribution – This technical summary is being distributed according to a standard distribution. Direct distribution is being made to the Regions and Divisions.

Availability – The publication will be available . Copies will be available from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. A limited number of copies will be available from the R & T Report Center, HRD-11, FHWA, 6300 Georgetown Pike, McLean, Virginia 22101-2296.

Key Words – electrochemical impedance spectroscopy, corrosivity, corrosion, inhibitors, deicers, sodium chloride, calcium magnesium acetate, concrete, rebar corrosion.

Notice – The technical summary is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The summary provides a synopsis of the study's final publication. The summary does not establish policies or regulations, nor does it imply FHWA endorsement of the conclusions or recommendations. The U.S. Government assumes no liability for the contents or their use.

Corrosion Rates of Various Deicers



Publication No. FHWA-RD-178, "Impedance Spectroscopy for the Evaluation of Corrosion Inhibitors in Highway Deicers", U.S. Federal Highway Administration, March 1997.

Frequently Asked Questions

What is CMA?

Cryotech CMA® is solid calcium magnesium acetate, a low-corrosion, environmentally safe deicer. It is used on roads, bridges, parking garages, and corporate campuses - wherever corrosion, concrete damage, or the environment are of concern. CMA can also be liquefied in the field for anti-icing applications.

How is CMA made?

CMA is a simple combination of dolomitic lime and acetic acid (the principal component of vinegar). CMA is produced at Cryotech Deicing Technology in Fort Madison, Iowa.

Why was CMA developed?

There has long been a concern for damage to the environment and to structures like bridges and parking garages caused by the use of chloride deicers. In the 1970's, the Federal Highway Administration (FHWA) identified calcium magnesium acetate as the only low-corrosion chemical alternative to road salt that also protected the environment. Years of research and field applications have proven CMA is less corrosive than tap water and does not harm vegetation or receiving waters.

How does CMA work?

CMA, like road salt, works best above 20°F (-7°C), and is used at about the same rates as salt. Applied early in the storm, CMA prevents the formation of snow pack and the bonding of ice to the pavement surface. CMA interferes with the ability of snow and ice particles to adhere to each other or to the pavement, and therefore, the loose residue can be easily removed by broom or plow.

A key to successful use of CMA is a thorough understanding of the deicer's performance characteristics. Trained and experienced operators quickly adapt their applications and plowing techniques to take advantage of CMA's unique properties.

How can CMA be used?

- CMA can be used straight for direct application.
- CMA can be prewet with Cryotech CF7® Liquid Commercial Deicer (potassium acetate-based) to enhance its performance.
- CMA can be mixed with sand for direct application at various concentrations or to prevent the sand pile from freezing.
- CMA can be mixed with salt to reduce the corrosive nature of salt and reduce the volume of salt applied.
- CMA can be liquefied for use as a prewetting agent for direct anti-icing applications.

How long does CMA last?

CMA remains on the pavement surface longer than ordinary deicers, working longer to prevent bonding. This residual action reduces application frequency and makes snow removal easier.

The refreeze temperature of CMA solutions rises more slowly than sodium chloride, calcium chloride, or magnesium chloride. This feature makes it well suited for anti-icing treatments, especially for use in the pretreatment of bridge decks in anticipation of frosting, or localized icing conditions.

Does CMA require any special handling or equipment?

CMA is applied with the same equipment as other deicers and can be stored indefinitely when kept dry.

Does CMA affect health?

CMA is essentially non-toxic. A series of oral, inhalation, eye, and skin tests conducted in accordance with the U.S. Environmental Protection Agency (EPA) guidelines classify CMA as no more harmful to handle than common table salt.

Does CMA affect the environment?

When absorbed into the soil, CMA's calcium and magnesium components benefit the soil structure, just as adding lime to a garden improves permeability. The acetate portion of CMA biodegrades naturally.

Does CMA cause corrosion on roads, bridges, parking garages, etc.?

No significant corrosion of steel, aluminum, or concrete has been found in repeated tests with CMA sponsored by the FHWA, state Departments of Transportation, and private researchers.

Frequently Asked Questions

Is CMA safe for concrete and steel structures?

CMA is essentially noncorrosive. FHWA studies conclude that no chloride deicers (even inhibited) compare with CMA in minimizing corrosion to steel structures and reinforcement embedded in concrete. CMA does not chemically attack concrete, nor does it increase spalling caused by the freeze/thaw cycle of water. A study by the UK Department of Transportation concludes: "With the exception of CMA, all of the deicing chemicals tested resulted in a greater deterioration of the concrete than water alone... CMA was the only chemical on weak structural concrete which satisfied the criterion for scaling damage."

CMA cannot reverse damage caused by chloride salts, but replacing a portion of the salt with CMA can help to slow further salt damage. Laboratory studies have shown that CMA, when mixed with sodium chloride at a minimum 20% by weight, is significantly less corrosive than salt alone. This may help to extend the useful life of transportation structures while managing costs.

How much does CMA cost?

The purchase price of CMA is more than salt. However, studies of the life-cycle costs of salt indicate that when considering corrosion damage and environmental impact, the cost of salt often exceeds that of CMA.

Is there government awareness of CMA?

Non-chloride based Calcium Magnesium Acetate (Cryotech CMA®), Sodium Acetate (Cryotech NAAC®), and Potassium Acetate (Cryotech CF7®) deicers are eligible for matching Federal Funds under the MAP-21 act signed into law in July 2012. Through the MAP-21 act, funds are available for low corrosive anti-icing/deicing applications and environmentally preferred anti-icers/deicers used on highway bridges through 2014. MAP-21 builds on the foundation established by Federal highway and surface transportation acts for over a decade, which make federal funds available for the use of such safer deicers to help preserve and rehabilitate America's bridges.

Is Cryotech ISO certified?

Cryotech Deicing Technology is certified to ISO 9001:2008 and 14001:2004 standards.

TO ORDER CMA OR FOR MORE INFORMATION CONTACT:

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WWW.CRYOTECH.COM

Frequently Asked Questions

Cryotech Cryotech CMA40® is Cryotech CMA® at a concentration of 40% by weight blended with a high quality grade of salt. This product is recommended where protection from corrosion and concrete spalling is needed, but limited quantities of salt can be tolerated. CMA does not damage steel; however chlorides in salt may penetrate the concrete. Cryotech recommends using only 100% CMA where steel or steel reinforcing may be present.

Product Information

What is CMA?

CMA is produced from natural dolomitic lime and acetic acid (a principal component of vinegar). CMA is produced at Cryotech's manufacturing facility in Fort Madison, Iowa.

Why was CMA developed?

There has long been a concern for damage to the environment and to structures like bridges and parking garages caused by the use of chloride deicers. In the 1970's, the Federal Highway Administration (FHWA) identified calcium magnesium acetate as the only low-corrosion chemical alternative to road salt that also protected the environment. Years of research and field applications have proven CMA is no more corrosive than tap water and does not harm vegetation or receiving waters.

Why blend CMA and sodium chloride?

Laboratory studies have shown that CMA, when mixed with sodium chloride at a minimum 20%, by weight, is significantly less corrosive than salt to exposed steel. The more CMA in the blend, the better the corrosion and concrete spalling protection.

What is CMA40?

Cryotech CMA40 is a blend of 40%, by weight, solid calcium magnesium acetate (Cryotech CMA), a low-corrosion, environmentally safe deicer and 60% sodium chloride (rock salt).

How does CMA40 work?

CMA40, like road salt, works best above 20°F (-7°C), and is used at about the same rates as salt. Applied early in the storm, CMA40 prevents the formation of snow pack and the bonding of ice to the pavement surface. CMA40 interferes with the ability of snow and ice crystals to adhere to each other or to the pavement, keeping the loose residue easily removable by broom or plow.

A key to successful use of CMA40 is a thorough understanding of the deicer's performance characteristics. Trained and experienced operators quickly adapt their applications and plowing techniques to take advantage of CMA40's unique properties.

How long does CMA40 last?

The refreeze temperature of a CMA40 solution rises more slowly than that of sodium chloride, calcium chloride, or magnesium chloride solutions. This tendency allows CMA40 to remain on the pavement surface longer than ordinary deicers, providing prolonged bond prevention. This residual action also reduces application frequency and makes snow removal easier.

Does CMA40 require any special handling or equipment?

No, CMA40 is applied with the same equipment as other deicers. Furthermore, CMA40 can be stored indefinitely when kept dry.

Is CMA40 safe?

CMA40 is essentially non-toxic. A series of oral, inhalation, eye, and skin tests conducted in accordance with the U.S. Environmental Protection Agency (EPA) guidelines classify CMA40 as no more harmful to handle than common table salt.

How much does CMA40 cost?

The purchase price of CMA40 is more than salt. However, studies of the life-cycle costs of salt indicate that when considering corrosion damage and environmental impact, the cost of salt often exceeds that of CMA40.

What can I do to be sure I am purchasing the correct blend?

Read Labels Closely: Many products state they are made with CMA yet only contain 1-2% CMA, by weight, and the rest of the mixture is chloride-based. This small amount of CMA would be ineffective in stopping corrosion.

Ask Questions: Your distributor should be able to provide the exact amount of each ingredient in the deicer blend to ensure you are receiving an adequate amount of pure CMA.

Double-Check Pricing: If one price quote is much lower or higher than the others, be sure to ask the above questions to verify the same amount of CMA is being used in all products.

Customers also need to be aware that some products claim they contain CMA or calcium magnesium acetate but they actually contain a physical blend of calcium acetate and magnesium acetate. Cryotech CMA is a patented formulation and each pellet contains a specific ratio of calcium and magnesium. It has undergone significant testing to show it is safe for concrete.

Frequently Asked Questions

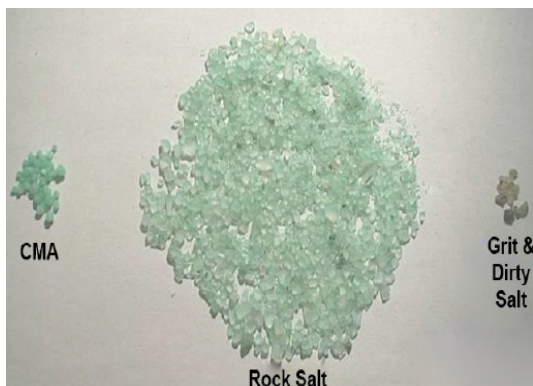
A number of laboratory tests suggest that Cryotech CMA® may significantly reduce corrosion rates when combined with salt. Although tests were different in type and duration of exposure, all indicated that a minimum of 20% CMA, by weight, is needed in a CMA/salt blend to provide acceptable corrosion protection. Testing at 20% CMA and 80% salt, by weight, resulted in a 70 to 80% reduction in corrosion over testing with pure road salt (sodium chloride). The best corrosion protection results from the use of pure CMA. In order to receive the maximum corrosion protection benefit from CMA deicer blends, it is important to verify the amount of CMA being used in the mixture. Cryotech CMA is the only commercially available pure calcium magnesium acetate produced and sold in the United States. This product is often blended with other chloride deicers and marketed as "Containing CMA" when it actually contains only a negligible amount of pure CMA. The below examples are offered to help you determine the quantity of CMA in your deicer blend.



Cryotech CMA is a minimum of 96%, by weight, hydrated calcium magnesium and other acetates with less than 4%, by weight, water-insoluble material. Notice the uniform appearance of the pellets. This is Uni-pel technology, a unique process which ensures each pellet receives the same distribution of active ingredient. CMA provides the most protection from concrete spalling and is less corrosive than tap water.



Cryotech CMA40 is Cryotech CMA at a concentration of 40% by weight blended with a high quality grade of salt. Notice the amount of Cryotech CMA pellets in this blend. The more CMA in the blend the better the protection.



This product that contains calcium magnesium acetate blended to less than 20%, by weight. An analysis, performed by an independent laboratory shows this blend to be less than 5% CMA, by weight, providing little or no protection against concrete spalling and corrosion.

FOR MORE INFORMATION CONTACT:

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Commercial/Highway Application and Product Handling Guidelines

Cryotech CMA® is pelleted calcium magnesium acetate, a low corrosion environmental alternative to ordinary deicers like road salt, calcium chloride, magnesium chloride, and urea. CMA is selected for applications when a low corrosion, environmentally friendly deicer is preferred. Although CMA works differently than common deicers, when used according to these guidelines it is just as, if not more, effective.

PLEASE READ THE PRODUCT SDS PRIOR TO HANDLING

CMA Works Differently

CMA is exothermic; heat is released as the pellets burrow to the surface:

- Early application of CMA (as the snow begins to fall and prior to ice formation) will significantly improve its performance.
- CMA does not create a flowing brine. Instead, it prevents ice/snow crystals from sticking together, preventing them from packing and adhering to the surface.
- CMA must be allowed sufficient time to work.
- CMA will undercut ice. Plow, shovel, or sweep to remove snow or ice pack as soon as surface bond is broken.

CMA Has Improved Coverage

CMA sticks to the surface, giving residual, anti-icing action:

- Better than salt at preventing pack.
- Uniform pellet size ensures even spreading.
- Requires fewer applications, residual anti-icing action may continue between storms.

CMA weighs 44 lbs/ft³:

- Proper equipment calibration is important to compensate for density.
- At the same application rate, CMA provides more particles per square foot than salt.

CMA Packaging/ Handling

CMA comes in three packaging options:

- Bulk - 20 metric ton minimum
- 2205 lb (1000 kg) Super Sacks (1 per pallet, minimum 1 pallet).
- 55 lb (25 kg) poly bags (40 per pallet, minimum 1 pallet).

Procedures for handling and emptying packages:

CMA pellets have a natural tendency to loosely stick to one another during storage. If the package exterior feels stiff to the touch, the product may have compacted in storage. If compaction does occur, the following procedures for emptying the packages are recommended:

- 2205 lb (1000 kg) Super Sack - use forklift to lift by straps, drop bag a short distance onto the floor (2-3 times) to loosen any compacted product. Then use the drawstring chute at the bottom of the bag, or use a knife to slit the bottom, and allow product to flow.
- 55 lb (25 kg) poly bag - drop bag onto hard surface 2-3 times (similar to the way you loosen a bag of ice).

Keep CMA in Dry Storage

CMA Storage:

- CMA may cake in equipment if it gets wet. Don't park loaded spreading equipment outside in the weather.
- Keep equipment exterior surfaces clean.
- Close open bags after use or cover bulk product.
- If overhandling causes dust, wear a paper dust mask and goggles.

Commercial/Highway Application and Product Handling

CMA Application

CMA Application:

The amount of CMA to be applied is determined by surface conditions as they develop during a storm such factors as pavement temperature, air temperature, rate and type of precipitation, traffic, weather forecast, and equipment availability must be considered. Experience with local conditions is a critical factor in deicing operations. After operators gain experience, CMA applications and rates should be adjusted locally as required.

Commercial Application Rates:

- On thin ice, near freezing, typically start at 20 lbs/1000ft²

Highway Application Rates:

- On thin ice, near freezing, typically start at 300-400 lbs/lane mile (20-40 g/m²). Spread CMA across the entire lane
- For anti-icing apply just as surface turns white, snow begins to stick, or ice begins to form. Premature application may result in product loss from traffic or wind. Late application reduces effectiveness.
- For deicing allow enough time for CMA to penetrate to the surface and loosen the ice or snow pack before plowing, shoveling, or brooming. CMA will penetrate more quickly at higher temperatures and time should be adjusted according to temperature and quantity of the ice or snow pack. Once loosened, it is important to quickly remove the snow pack to prevent refreeze because of dilution of the deicer.
- Expect a good residual effect.
- Re-apply when new snow accumulation shows first tendency to pack or bond to the surface, or surface starts to refreeze.
- Like roadsalt, product effectiveness diminishes below 20°F (-7°C).

CMA Can be Prewet

Prewetting CMA:

- CMA's effectiveness is enhanced when prewetting it with Cryotech CF7® at the spreader spinner.
- Prewetting causes CMA to stick and begin melting almost immediately after application.
- The freezing point of the combined products is lower than that of pure CMA.

CMA Treated Snow Looks Different

CMA treated surfaces are drier:

- Lighter, fluffier snow is easier to shovel or plow.
- Dry oatmeal-like appearance means good traction - not likely to pack with traffic.
- After the storm, CMA treated surfaces are dark and markings are clearly visible.

CMA and Sand

CMA/Sand Mixtures:

- CMA alone works best, but CMA can be mixed with sand as a traction aid. If mixing CMA with sand, blend it like salt/sand mixtures. Six parts CMA by weight to four parts sand is a common practice.
- Use 5% CMA by weight to keep sand piles free flowing in freezing weather.

FOR MORE INFORMATION CONTACT:

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Guidance on Moving Ahead for Progress in the 21st Century (MAP-21) Act

Non-chloride based Calcium Magnesium Acetate (Cryotech CMA[®]), Sodium Acetate (Cryotech NAAC[®]), and Potassium Acetate (Cryotech CF7[®]) deicers are eligible for matching Federal Funds under the MAP-21 act signed into law in July 2012. Through the MAP-21 act, funds are available for low corrosive anti-icing/deicing applications and environmentally preferred anti-icers/deicers used on highway bridges through 2014. MAP-21 builds on the foundation established by Federal highway and surface transportation acts for over a decade, which make federal funds available for the use of such safer deicers to help preserve and rehabilitate America's bridges.

TITLE I—FEDERAL-AID HIGHWAYS **Subtitle A—Authorization and Programs**

SEC. 1101. AUTHORIZATION OF APPROPRIATIONS.

(a) In General.—The following sums are authorized to be appropriated out of the Highway Trust Fund (other than the Mass Transit Account):

(1) Federal-Aid Highway Program.—For the national highway performance program under section 119 of title 23, United States Code, the surface transportation program under section 133 of that title, the highway safety improvement program under section 148 of that title, the congestion mitigation and air quality improvement program under section 149 of that title, and to carry out section 134 of that title—

(A) \$37,476,819,674 for fiscal year 2013; and

(B) \$37,798,000,000 for fiscal year 2014.

[. .]

SEC. 1108 . SURFACE TRANSPORTATION PROGRAM

Title 23, United States Code § 133(b) amended to read as follows:

(b) Eligible Projects.— A State may obligate funds apportioned to it under section 104(b)(2) for the surface transportation program only for the following:

(1) Construction, reconstruction, rehabilitation, resurfacing, restoration, preservation, or operational improvements for highways, including construction of designated routes of the Appalachian development highway system and local access roads under section 14501 of title 40.

(2) Replacement (including replacement with fill material), rehabilitation, preservation, protection (including painting, scour countermeasures, seismic retrofits, impact protection measures, security countermeasures, and protection against extreme events) and application of calcium magnesium acetate, sodium acetate/formate, or other environmentally acceptable, minimally corrosive anti-icing and deicing compositions for bridges (and approaches to bridges and other elevated structures) and tunnels on public roads of all functional classifications, including any such construction or reconstruction necessary to accommodate other transportation modes.

[. .]

Additional information can be found at <http://www.fhwa.dot.gov/map21/>



CRYOTECH CMA® SOLID COMMERCIAL DEICER TRAINING AGENDA

To: CMA Customers

From: Tony Myhra, Product Manager

Subject: **CMA Training Agenda** – using slides and video

Complimentary training offered after award of a contract or blanket p.o.

Schedule - based on Product Manager availability and needs of customer

5 minutes - **CMA introduction**
History
Product specifications

30 minutes - **CMA application**
Rates
Timing
Methods of application for various storm conditions
When to re-apply
Review actual storm situations

15 minutes - **CMA handling safety**
MSDS
Care of equipment
Environmental

10 minutes - **Wrap-up**
Review
Question and answer period



**CRYOTECH CMA® SOLID COMMERCIAL DEICER (the Product)
WARRANTY**

Cryotech Deicing Technology warrants that the product to be delivered hereunder shall conform to the specifications attached hereto; and upon receipt of payment therefore, shall be free from any security interest or encumbrance. Cryotech **disclaims** all warranties and conditions, either express or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose. In no event shall Cryotech be liable to the Buyer or to any third party for any indirect, incidental, special, consequential, punitive, or exemplary damages (including without limitation lost profits, lost savings, or loss of business opportunity) arising out of or relating to the product, or the use or inability to use the same, even if Cryotech has been advised of the possibility of such damages.



PACIFIC NORTHWEST SNOWFIGHTERS (PNS) APPROVED PRODUCTS

Non-chloride Calcium Magnesium Acetate (Cryotech CMA[®]), Potassium Acetate (Cryotech CF7[®]), and Liquid CMA (A 25% mixture of Cryotech CMA[®] and potable water) are located on the Pacific Northwest Snowfighters (PNS) Association's approved product list. The transportation agencies of Washington, Oregon, Montana, Idaho, and the province of British Columbia formed PNS several years ago to outline specifications for deicing chemicals.

For more information regarding the PNS Association, please visit:

<http://pnsassociation.org>

NOTICE PROPRIETARY INFORMATION: THIS DOCUMENT IS THE PROPERTY OF GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION DBA CRYOTECH DEICING TECHNOLOGY. THE INFORMATION CONTAINED HEREIN IS SUBMITTED IN CONFIDENCE. IT CONTAINS TRADE SECRETS OR CONFIDENTIAL COMMERCIAL OR FINANCIAL INFORMATION EXEMPT FROM DISCLOSURE BY 5 U.S.C. SECTION 552(B)(3) AND (4) (FREEDOM OF INFORMATION ACT), AND 18 U.S.C. SECTION 1905 (TRADE SECRETS ACT). EXCEPT WITH THE WRITTEN CONSENT OF GENERAL ATOMICS INTERNATIONAL SERVICES CORPORATION DBA CRYOTECH DEICING TECHNOLOGY (1) THIS DOCUMENT MAY NOT BE COPIED IN WHOLE OR IN PART AND WILL BE RETURNED UPON REQUEST OR WHEN NO LONGER NEEDED BY RECIPIENT AND (2) INFORMATION CONTAINED HEREIN MAY NOT BE COMMUNICATED TO OTHERS AND MAY BE USED BY RECIPIENT ONLY FOR THE PURPOSE FOR WHICH IT WAS TRANSMITTED.



CRYOTECH CMA® CUSTOMER REFERENCES

Cryotech CMA® Solid Commercial Deicer is used by major U.S. Departments of Transportation, hospitals and other facilities. The following list includes a sample of customers who have purchased CMA (96% Calcium Magnesium Acetate):

Customer	Contact	Telephone	E-mail
Alabama DOT-Guntersville	Denise Estes	256-571-7215	estesd@dot.state.al.us
Blue Cross Blue Shield	Mike Schneider	248-763-5891	Mschneider@bcbsm.com
Tennessee DOT	Natasha Word	615-350-4586	Natasha.word@state.tn.us
City of Aurora, NE	Mike Eberhardt	402-694-2511	streets@aurora.org

Do not hesitate to contact Cryotech or any of the above customers with questions.